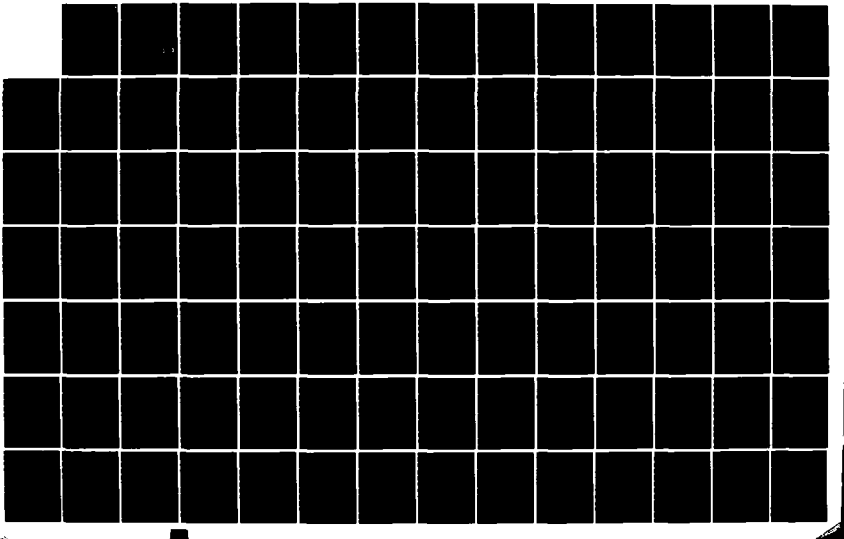
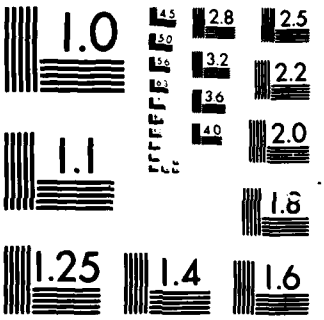
AD-A163 693 CONTROLLING NONPOINT POLLUTION IN VIRGINIA'S URBANIZING AREAS: AN INSTITUTIONAL PERSPECTIVE(U) ARMY MILITARY PERSONNEL CENTER ALEXANDRIA VA G M WELLS 20 JAN 86 1/2

UNCLASSIFIED F/G 13/2 NL





CONTROLLING NONPOINT POLLUTION IN VIRGINIA'S URBANIZING AREAS:

AN INSTITUTIONAL PERSPECTIVE

Captain Gordon Marshall Wells
HQDA, MILPERCEN (DAPC-OPA-E)
200 Stovall Street
Alexandria, VA 22332

Thesis (Final Report), Approved 20 January 1986

A Thesis Submitted to the Faculty of the
Virginia Polytechnic Institute & State University
in Partial Fulfillment of the Requirements for the Degree of
Master of Science
in
Civil Engineering
Blacksburg, Virginia

UNCLASSIFIED

SECURITY CLASSIFICATION OF THIS PAGE *(When Data Entered)*

REPORT DOCUMENTATION PAGE		READ INSTRUCTIONS BEFORE COMPLETING FORM
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. RECIPIENT'S CATALOG NUMBER
4. TITLE *(and Subtitle)* Controlling Nonpoint Pollution in Virginia's Urbanizing Areas: An Institutional Perspective		5. TYPE OF REPORT & PERIOD COVERED Thesis (Final Report) Approved January 20, 1986 6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Captain Gordon Marshall Wells		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS Student, HQDA, MILPERCEN (DAPC-OPA-E), 200Stovall Street, Alexandria, Virginia 22332		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS HQDA, MILPERCEN, ATTN: DAPC-OPA-E, 200 Stovall Street, Alexandria, Virginia 22332		12. REPORT DATE 20 January 1986 13. NUMBER OF PAGES 158
14. MONITORING AGENCY NAME & ADDRESS*(if different from Controlling Office)*		15. SECURITY CLASS. *(of this report)* UNCLASSIFIED 15a. DECLASSIFICATION/DOWNGRADING SCHEDULE

16. DISTRIBUTION STATEMENT *(of this Report)*

Approved for public release; distribution unlimited.

17. DISTRIBUTION STATEMENT *(of the abstract entered in Block 20, if different from Report)*

18. SUPPLEMENTARY NOTES

Thesis submitted to the faculty of the Virginia Polytechnic Institute & State University in partial fulfillment of the requirements for the degree of Master of Science in Civil Engineering.

19. KEY WORDS *(Continue on reverse side if necessary and identify by block number)*

nonpoint source pollution, best management practices, liability, constitutional protection of private property, Federal Water Pollution Control Act, Virginia Erosion and Sediment Control Law, Section 208 (Clean Water Act) Planning

20. ABSTRACT *(Continue on reverse side if necessary and identify by block number)*

This paper evaluates the effectiveness of the institutional framework of the Commonwealth of Virginia in the implementation and enforcement of nonpoint source (NPS) pollution control measures in the state's urbanizing areas. The institutional framework is developed primarily around the existing governmental framework. The federal, state and local roles are examined in terms of the relevant legislative and executive NPS control activities already taking place. The judicial function is considered in terms of constitutional guarantees of protection of private property and the potential for liability stemming from the implementation of structural and nonstructural best management practices (BMP's).

DD FORM 1 JAN 73 1473 EDITION OF 1 NOV 65 IS OBSOLETE

UNCLASSIFIED

SECURITY CLASSIFICATION OF THIS PAGE *(When Data Entered)*

Three generic categories of BMP's are evaluated in light of this institutional environment: on-site BMP's, off-site BMP's, and nonstructural BMP's. Where they are relevant, various subcategories of the institutional environment are examined: mechanisms and responsibility for financing and maintenance, managing future urban growth and mediating interjurisdictional arrangements. The introduction and first four chapters develop this material and the final chapter is an analysis of the existing state programs (the Erosion and Sediment Control Law and the State Water Control Board's voluntary Urban NPS Control and Abatement Program). The product of this analysis is the conclusion that both state programs are weak due to a lack of adequate state oversight.

Controlling Nonpoint Pollution in Virginia's Urbanizing Areas:

An Institutional Perspective

by

Gordon Marshall Wells

Thesis submitted to the Faculty of the

Virginia Polytechnic Institute and State University

in partial fulfillment of the requirements for the degree of

Master of Science

in

Civil Engineering

APPROVED:

William E. Cox, Chairman

Chin Y. Kuo

John Randolph

January, 1986

Blacksburg, Virginia

Controlling Nonpoint Pollution in Virginia's Urbanizing Areas:

An Institutional Perspective

by

Gordon Marshall Wells

William E. Cox, Chairman

Civil Engineering

(ABSTRACT)

This paper evaluates the effectiveness of the institutional framework of the Commonwealth of Virginia in the implementation and enforcement of nonpoint source (NPS) pollution control measures in the state's urbanizing areas. The institutional framework is developed primarily around the existing governmental framework. The federal, state and local roles are examined in terms of the relevant legislative and executive NPS control activities already taking place. The judicial function is considered in terms of constitutional guarantees of protection of private property and the potential for liability stemming from the implementation of structural and nonstructural best management practices (BMP's).

Three generic categories of BMP's are evaluated in light of this institutional environment: on-site BMP's, off-site BMP's and nonstructural BMP's. Where they are relevant, various subcategories of the institutional environment are examined: mechanisms and responsibility for financing and maintenance, managing future urban growth and mediating interjurisdictional arrangements. The introduction and first four chapters develop this material and the final chapter is an analysis of the

existing state programs (the Erosion and Sediment Control Law and the State Water Control Board's voluntary Urban NPS Control and Abatement Program).

The product of this analysis is the conclusion that both state programs analyzed are weak due to a lack of state oversight. In addition, the Erosion and Sediment Control Program could be strengthened by amending the law to add a viable "stop work" order and by defining violations as being civil rather than criminal (misdemeanors) violations.

ACKNOWLEDGEMENTS

I wish to thank Dr. William E. Cox, whose generous assistance and guidance have been major factors in the successful completion of this thesis. Without his expertise in institutional matters relative to water resources, I would not have had the opportunity to explore the issues contained herein with as much discernment nor in as much depth as I was able to.

Likewise, I owe a debt of thanks to Dr. Chin Y. Kuo and Dr. John Randolph, who served faithfully as committee members and editors. I specifically wish to acknowledge Dr. Randolph's expertise as both a Civil Engineer and an Urban Planner as being a significant factor in the molding of this final product.

I also wish to thank my wife, Ellen, whose unending patience, love and understanding have been major sources of motivation to me, especially when my discernment was at a minimum and the depth of my research was drowning me!

Most important, I wish to acknowledge the fact that only through the grace of Jesus Christ am I ever able to accomplish anything in life. Further, it is my belief that **only** through a relationship with God does life begin to have true meaning. The opportunity to study at Virginia Tech has been tremendous, one for which I am very thankful. Nevertheless, if I didn't

know God personally, graduate school would inevitably be nothing more than another "activity" on the lifelong road to death. As Solomon put it in the Book of Ecclesiastes:

> "Meaningless! Meaningless!
> says the Teacher.
> Utterly meaningless!
> Everything is meaningless. . . .
>
> I devoted myself to study
> and to explore by wisdom
> all that is done under heaven. . . .
>
> Of making many books there is no end,
> and much study wearies the body. . . .
>
> Now all has been heard;
> here is the conclusion of the matter:
> Fear God and keep his commandments,
> for this is the whole duty of man."

TABLE OF CONTENTS

INTRODUCTION

The purpose of this paper is to evaluate the effectiveness of the institutional framework of the Commonwealth of Virginia in both implementing and enforcing nonpoint source pollution (NPS) control measures (best management practices) in Virginia's urbanizing areas. For the purposes of this discussion, the institutional framework will center primarily on those activities taking place within the existing governmental framework. An overview of this "institutional environment" is presented in the first chapter.

Subsequent chapters discuss specific categories of best management practices (BMP's). The Virginia State Water Control Board categorizes BMP's into the following three categories:

Pollution Source Controls: Practices that are intended to improve runoff quality by reducing the generation and accumulation of potential runoff contaminants at or near their sources [street cleaning, solid waste collection and disposal, fertilizer application control, pesticide use control, highway deicing compound control, erosion and sediment controls on construction sites].

Runoff Controls: Practices that are aimed primarily at controlling the volume and discharge rate of runoff from urban areas [urban impoundments, parking lot storage, roof top detention, cistern

storage, infiltration pits and trenches, modular pavement, porous pavement, grassed swales, filter strips, seepage areas].

Collection and Treatment: Practices which deal with urban runoff after it has become polluted through collection and treatment alternatives [sewer system control, stormwater conveyance system storage, flow regulators, treatment].[1]

To facilitate an institutional evaluation of BMP's in Virginia, however, this paper will categorize best management practices into three generic classes: on-site BMP's, off-site BMP's and nonstructural BMP's. These categories were chosen simply because they lend themselves easily to a discussion of institutional issues: however, a qualitative understanding of the above SWCB definitions is useful.

The reason for limiting discussion to urbanizing areas is best stated in the following quote from the U.S. Environmental Protection Agency:

> The concept of preventing and reducing the source of stormwater pollution best applies to developing urban areas, for these are areas where man's encroachment is yet minimal, or at least controllable, and drainage essentially conforms to natural patterns and levels. Such lands, in consequence, offer the greatest flexibility of approach in preventing pollution.[2]

---

[1] Virginia Soil and Water Conservation Commission, Urban Best Management Practices Handbook (State Water Control Board Planning Bulletin 321), Virginia State Water Control Board, Richmond, Virginia, 1979, pp. II-1 to II-6.

[2] Lager, John A. et al (Metcalf & Eddy), Urban Stormwater Management and Technology: Update and Users Guide, prepared for the Municipal Environmental Research Laboratory, Office of Research and Development, U.S. Environmental Protection Agency, Cincinnati, September 1977, p. 140.

In addition to the increased flexibility provided to local planners and engineers, prior planning reduces the need for expensive "retrofiting" of structural measures after urbanization is complete. Therefore, it is worthy to focus discussion on the developing urban areas of Virginia.

Although this paper will use the existing governmental structure as a matrix around which to develop the discussion of the institutional framework, clearly, there is more to institutional issues than those which are the focus of the three major branches of government. The general beliefs and attitudes of a population, as well as its understanding of a particular issue, are often of greater significance than existing legislation and/or executive programs. As John Naisbitt has stated in his book, Megatrends, "The most reliable way to anticipate the future is by understanding the present."[3] Therefore, a brief overview of how much scientific evidence presently exists concerning NPS pollution, as well as the public education process involved are presented. In addition, although an in-depth study of social and political issues is beyond the scope of this paper, the unique political orientation of Virginia's citizenry must be considered.

---

[3] Naisbitt, John, Megatrends, Warner Books, New York, N.Y., 1984, p. xxiii.

NPS POLLUTION: A LACK OF SCIENTIFIC DATA ?

It is often claimed that the single major obstacle to implementing effective, NPS control programs is the lack of scientific data on the subject which clearly correlates runoff and land use with water quality. This claim has merit. Because NPS pollution, until recently, has not received significant attention in the scientific community as a major source of water pollution, scientific data on the subject is not yet fully developed. This deficiency leads to the single greatest institutional obstacle to the establishment of any program directed towards alleviating NPS pollution: a general lack of public understanding of the nature of NPS pollution.

Nevertheless, a steadily-developing base of scientific data appears to be proving that NPS pollution is a significant source of pollutants affecting our nation's surface waters. The National Commission on Water Quality, in its 1976 Staff Report, stated that even after specified national point source effluent reductions are met for several pollutants in accordance with the national effluent limitations, significant loadings would remain for several key pollutants. The report went on to say that even with complete elimination of point source discharges, 79% of total nitrogen, 53% of total phosphorus, 98% of fecal coliforms, 92%

of total suspended solids and 37% of BOD (biochemical oxygen demand) would still remain as pollutants.[4]

Almost ten years later, this situation has not changed, but rather has been ratified. At a recent conference on nonpoint source pollution, the Administrator of the Environmental Protection Agency stated, "in six of 10 EPA regions nonpoint sources are the principal remaining cause of water quality problems."[5] This statement is based on reports from the individual states to EPA on state water quality. In EPA's study of urban NPS pollution, the Nationwide Urban Runoff Program (NURP), degradation of the nation's waters by urban runoff was found to be significant:

> NURP found significant instances of high levels of heavy metals (especially copper, lead and zinc) in urban runoff. Freshwater water quality standards (chronic) were exceeded for lead (94% of all samples), copper (82%), zinc (77%) and cadmium (48%). Nationwide, BOD loadings from runoff were estimated as comparable to that from secondary POTW's [publicly owned treatment works], while TSS [total suspended solids] loadings were estimated to be a factor of 10 higher than loadings from POTW's. Fecal coliform levels also indicated significant impacts from urban storm runoff, especially from runoff into lakes and shellfish harvesting areas.[6]

A recent study in Virginia indicated clear evidence of a cause-effect relationship between certain urban land-use activities and nonpoint pol-

---

[4] National Commission on Water Quality, 1976 Staff Report, Washington, D.C., January, 1976, p. 21.

[5] Lee M. Thomas, Administrator, U.S. Environmental Protection Agency, in Perspectives on Nonpoint Source Pollution, Proceedings of a National Conference, Kansas City, Missouri, May 19-22, 1985. p. 1.

[6] The Federal Register, September 26, 1984, p. 49 FR 38013.

lution.[7] The scientific data on nonpoint pollution, therefore, has developed to the point where it can generally be accepted that there is a definite causal relationship between runoff and water quality. Whether or not there is enough evidence to convince both the public at large and governmental officials is a question which remains to be answered. Assuming that sufficient scientific evidence does exist, the obvious question at this point is, "How do we convert what we know into positive action to solve the problem?" Because this is a discussion of institutional issues, this question is best understood from the point of view of a public official, the person who must make this conversion.

NPS POLLUTION: NEED FOR PUBLIC EDUCATION

A discharge emanating from a single point source, such as a municipal waste treatment plant or industrial outfall, causing receiving waters to be polluted, carries with it certain advantages to enlightened governmental authorities desiring to control its effects. As is the case most often in human relations, perceptions often exceed truth in relative importance in influencing action; i.e., if people do not perceive something (such as pollution) to be a problem, then it is not likely to receive much attention, no matter how ominous it may be. As holders and seekers of public office, politicians naturally tend to be pragmatists who, whatever

---

[7] Northern Virginia Planning District Commission and Virginia Polytechnic Institute and State University, "Occoquan/Four Mile Run Nonpoint Source Correlation Study," Final Report prepared for Metropolitan Washington Water Resources Planning Board, Washington, D.C., July 1978.

their motivations may be, are more likely to focus on those issues for which they are prone to achieve success in the short term. This has certainly been the case with the legislative response to point source pollution at the national level.

In the 1960's, the stage was set for national legislation aimed at controlling water pollution, as Rachael Carson warned the world of the possibility of a future "Silent Spring" and news reports of contaminated swimming areas, fish kills and defiled private and public water supplies illustrated the extent to which water pollution could actually affect humankind. With such a tremendous amount of publicity being generated over the threat of environmental destruction and an accompanying groundswell of public opinion following suit, Congress was able to pass the 1972 Federal Water Pollution Control Act (FWPCA), a complete replacement of the original 1948 FWPCA. The FWPCA (later amended in 1977 and renamed the Clean Water Act) established a goal of "no discharge" into the navigable waters of the United States by 1985 and an interim goal of "fishable/swimmable waters" by July 1, 1983.[8] As admirable as these goals were (albeit, the "no discharge" goal was not entirely realistic), water pollution was still primarily viewed as coming from the more obvious point sources; i.e., "any discernible, confined and discrete conveyance . . . [such as] any pipe, ditch, channel, tunnel, conduit, . . . from which pollutants are or may be discharged."[9] The point is that pollution from

---

[8] 33 U.S.C.A. § 1251 (a) (1978).

[9] Id at § 1362 (14).

point sources presented enough of a "clear and present danger" to instigate decisive action on the part of government leaders, prompted by the momentum of public opinion.

On the other hand, a source of pollution which is very subtle in appearance, no matter how potent it may be, is not likely to cause general public alarm. Nonetheless, the Congress recognized that NPS pollution is a contributor to the overall water pollution problem but left its control at the state and local level under Section 208 of the act. With the regulation of nonpoint pollution sources being delegated by the federal government to the states, at this point an understanding of the "political environment" of Virginia is necessary. Such understanding is important, not only to the public education process required, but also to the atmosphere within which NPS pollution issues will be debated in the Old Dominion.

VIRGINIA: A CONSERVATIVE BODY POLITIC

Virginians, in fact Americans in general, have recently tended to become wary of leadership which tends toward extremes. The recent shift toward greater conservatism and the realization that government is not the panacea for all of society's problems has given the Reagan administration and the "New Federalism" a tremendous amount of momentum at the national level. Although it may be a new idea among other Americans that the best solution to a particular problem is **not** necessarily to "throw more government at it," this is certainly not a new concept to Virginians. Among

the individual states, Virginia would undoubtedly rank high as both a conservative state and as a people with a history of distaste for big government.

Virginia's own son, Thomas Jefferson, said that "the government that governs least, governs best," and in commenting on the state constitution of 1776 which gave a great deal of power to the legislature, advised that "173 despots (the number of Virginia legislators) would surely be as oppressive as one." In more recent history, it was Virginia which, for nearly 60 years, supported the highly conservative "Byrd Organization."[10] Likewise, in the present era of federal budget cutting and concern over the growing national deficit, it should be no surprise to note that Virginia has long a clause in its Constitution which states that, within certain limitations, "No debt shall be contracted by or in behalf of the Commonwealth."[11] Further, only in Virginia has a conservative Democrat, Mills E. Godwin, served as governor for a term, and then when the state Democratic party was becoming almost as liberal as the national Democratic party, ran for governor four years later as a conservative Republican and won.[12]

---

[10] Latimer, James, "Godwin's 30 Years: A Cycle of Change?", in The Richmond Times Dispatch, January 8, 1978, pp. F-1, F-2.

[11] Constitution of Virginia, 1971, Article X, § 9.

[12] Latimer, p. F-2.

In grappling with the issue of nonpoint source pollution in urbanizing areas in Virginia, therefore, more than the scientific facts are involved. Whereas a greater base of scientific data is needed, a concurrent need exists for increased public education over the entire NPS problem. However, those who would "educate" must recognize the conservative fiber in their "students." Furthermore, any programs implemented in Virginia, at either the state or local level, will only be completely successful if they are acceptable to the people of Virginia. These issues are important to keep in mind for anyone operating within the governmental framework who is attempting to initiate or implement efforts to mitigate NPS pollution in the Commonwealth of Virginia.

CHAPTER ONE: THE INSTITUTIONAL ENVIRONMENT

Although institutional issues extend beyond governmental issues, the institutional environment in which BMP implementation will take place can be evaluated in terms of the roles played by the federal, state and local levels of government. The NPS pollution problem has generally been accepted as being a nation-wide problem which is most effectively solved at the local level. Therefore, the orientation of this paper is primarily from the local perspective. To do this most effectively, the Federal role in abating NPS pollution will be considered first, followed by discussions of the state role and the role of local governments.

Within each governmental level, the key components to consider are defined by the three major branches of government: legislative, executive, and judicial. The legislatures create the laws, or enabling legislation, which are the primary authority for establishing NPS abatement programs. Therefore, relevant existing legislation provides a useful point from which to begin discussion. The role of the executive will be discussed insofar as it encompasses the administrative agencies which must actually develop the programs necessary to execute the intent of the legislation. The judiciary plays a key role in passing judgment on the constitutionality of various actions of the other two branches as they affect the rights of citizens. The judiciary also resolves issues of liability when the actions of one party inflict harm on others. Finally,

the unofficial "fourth branch" of government, special interest groups, will be discussed since such groups can wield significant power.

THE FEDERAL ROLE

The Clean Water Act

In examining the Federal role in the abatement of NPS pollution, it is useful to review briefly past and present Federal water quality legislation. Prior to 1948, control of water pollution was almost entirely left up to the courts by means of lawsuits filed under various tort law doctrines, such as nuisance or trespass. In 1948 Congress passed the Federal Water Pollution Control Act (FWPCA) which essentially focused on pollution of interstate waters and had limited authority and effectiveness. This act was amended several times over a twenty-year period until, in 1972, the law was essentially rewritten.[13] It was again amended in both 1977 (renamed the Clean Water Act) and in 1981.

The act sets forth two primary goals: the complete elimination of pollutant discharge into the navigable waters of the United States by 1985 and the attainment of "fishable-swimmable" waters by 1983.[14] The Clean

---

[13] Findley and Farber, Environmental Law, West Publishing Co., St. Paul Minn., 1981, pp. 48-50.

[14] 33 U.S.C.A. § 1251 (a) (1978).

Water Act focuses on point sources of pollution by defining effluent limitations for all types of point sources and by establishing a permit system [National Pollutant Discharge Elimination System (NPDES)] to enforce compliance.[15] Although the Clean Water Act is oriented primarily to point sources, section 208 of the act brings together federal efforts to regulate point sources with state-level measures to control NPS water pollution.

The U.S. Congress recognized that although NPS pollution is a significant contributor to the overall water pollution problem, its effects vary widely from state to state because local conditions (hydrogeologic, meteorologic, land use, etc.) are so varied. For that reason, NPS pollution abatement generally was left to the control of the states under Section 208 of the act.[16] (One major exception to this is runoff from surface mining operations[17] which is regulated under other national legislation.) EPA continues to view the control of NPS pollution as being primarily a state-oriented problem:

> State, areawide, and local agencies are expected to take the lead in developing and implementing NPS management programs where needed to meet water quality goals and designated uses. It is only at this level that there is enough flexibility and the ability to make site-specific and source-specific decisions necessary for implementing effective NPS management programs. Solving NPS pollution problems requires commitment from all levels of government, but

---

[15] Id at § 1342.

[16] Id at § 1288.

[17] Surface Mining Control and Reclamation Act, 30 U.S.C.A. § 1201 et seq (Supp. 1985).

more intensified efforts at state, areawide, and local levels are essential for substantial progress.[18]

Therefore, the bulk of any study on nonpoint pollution control will be centered at the state and local level.

Federal Financial Assistance

The primary federal mechanism for providing financial assistance to both states and localities for NPS abatement is through grants authorized under sections 106 and 205 (j) of the Clean Water Act.[19] Such funds are intended to be primarily used by state and local planning agencies for Water Quality Management (WQM) planning rather than for funding the actual construction of structural BMP's. Recent information from the Virginia State Water Control Board reveals that most of these funds are allocated to the Water Control Board and to planning district commissions.[20] Therefore, at the present time, localities have little prospect of receiving Federal funding for the planning and construction of BMP's, and other means must be sought for this funding.

---

[18] The Nonpoint Source Task Force, U.S. Environmental Protection Agency, "Final U.S. Environmental Protection Agency Nonpoint Source Strategy," Nonpoint Sources Branch, U.S. Environmental Protection Agency, Washington, D.C., October 25, 1984, p. 1.

[19] 40 C.F.R. § 130.11 (a) (1985).

[20] Telephone interview with Bernard Caton, Director, Office of Policy Analysis, Virginia State Water Control Board, Richmond, Virginia, (November 12, 1985).

"Stormwater Point Sources"

Before closing this discussion of the federal role, it should be noted that EPA has adopted regulations to apply the NPDES permit program to certain kinds of urban runoff pollution. EPA regulations define "stormwater point sources" as being "a conveyance or system of conveyances (including pipes, conduits, ditches, and channels) primarily used for collecting and conveying stormwater runoff."[21] Furthermore, such "point sources" located in urban areas (as defined by the Bureau of Census) must constitute discharges emanating from industrial or commercial lands/facilities or as otherwise designated by the Administrator of EPA.[22] These regulations present a clear potential for EPA to define almost all urban areas as being "point sources," thereby providing a basis for direct regulation of stormwater pollution emanating therefrom.

If all urban runoff in Virginia were regulated by NPDES permit, discussions of state regulation of urban NPS pollution would become moot. However, the history of EPA's efforts to regulate urban stormwater by NPDES permit has been filled with controversy, and the program has not been fully implemented.[23] For EPA to regulate effectively urban

---

[21] 40 C.F.R. § 122.26 (b) (1985).

[22] Id.

[23] For further information on the historical development of EPA's regulation of urban stormwater, the reader should refer to the Federal Register, September 26, 1984, pp. 49 FR 38010-38016, March 7, 1985, pp. 49 FR 9362-9366 and August 12, 1985, pp. 50 FR 32548-32552.

stormwater runoff under the NPDES system, two major questions must be answered: "How will the administrative process of permitting be handled?" and, "To what degree will water quality sampling be required?"[24] Recently, a Washington D.C. consulting firm, Billings & Associates, estimated that if Group I cities (populations of 50,000 or more) are required to have a permit and sampling data for every stormwater outfall, the total cost for the processing of applications could well exceed 8.5 billion dollars.[25] Further, the firm estimated that the total cost to install the necessary pollution control equipment to comply with the permit standards nationwide would require outlays of about 647 billion dollars.[26] For the present time, the future of this program must be considered questionable, at least in its present form. Of course, should this program become fully operational, it would, like most NPDES programs, be administered by the states. Nevertheless, because many questions remain, this paper will focus on the existing institutional arrangements being employed at the state and local level.

THE STATE ROLE

The Constitution of Virginia states that

> [I]t shall be the policy of the Commonwealth to conserve, develop, and utilize its natural resources . . . protect its atmosphere,

---

[24] Water Pollution Control Federation, "Highlights," November 1985, Volume 22, Number 11, p. 4.

[25] Id.

[26] Id.

> lands, and waters from pollution, impairment, or destruction, for the benefit, enjoyment, and general welfare of the people of the Commonwealth.[27]

Consideration of this constitutional language provides a fitting backdrop to this discussion of the state role in NPS pollution abatement. As alluded to in the previous section, the state role is also shaped to a large degree by existing Federal legislation. Therefore, a fitting starting point is discussion of Virginia's 208 planning efforts under the Clean Water Act (CWA). An overview of the state nonpoint source control strategy will follow since it stems historically from the 208 requirements in CWA. Following this overview will be discussions of two major pieces of state legislation which support or potentially impact the state strategy: the State Water Control Law and the Erosion and Sediment Control Law. Finally, consideration of state mechanisms for mediating interjurisdictional disputes will be discussed.

208 Planning Under the Clean Water Act

Section 208 of the Clean Water Act is the significant federal legislation which requires state-level control of nonpoint pollution. Under section 208, the governor of each state was required to identify areas with substantial water quality problems and to designate planning agencies responsible for the development of "effective areawide waste treatment

---

[27] Constitution of Virginia, 1971, Article XI, § 1.

management plans."[28] Development of plans for areas not designated as having substantial water quality problems was the responsibility of the state planning agency.[29] The plans developed by these state agencies were required to be submitted to the Environmental Protection Agency for approval. In Virginia, the State Water Control Board developed these plans as the lead agency responsible for the state's 208 program.

In 1979, EPA issued regulations which consolidated several of the requirements of the Clean Water Act into a single integrated procedure called the Water Quality Management (WQM) Process. Within these regulations, each state may assume responsibility for all areas within the state and therefore submit a statewide waste treatment plan. In whatever manner the state chooses to report to EPA, these plans must describe "the regulatory and nonregulatory activities and Best Management Practices (BMP's) which the agency has selected as the means to control nonpoint source pollution."[30] Further, every two years, the states are also required to submit a report [called the "305 (b) Report"] on the current

---

[28] 33 U.S.C.A. § 1288 (a) (2) (1978).

[29] This was clarified in litigation involving the Natural Resources Defense Fund and the Environmental Protection Agency in federal District Court in 1975. See N.R.D.C. v. Train, 396 F. Supp. 1386 (DC DC 1975).

[30] 40 C.F.R. § 130.6 (c) (4) (i) (1985).

quality of state waters.[31] The 305 (b) reports are used to refine these statewide plans on an ongoing basis.[32]

Although the regulations do not denote any specific preference for a regulatory approach, they state that, "regulatory programs shall be identified where they are determined to be necessary by the State to attain or maintain an approved water use or where non-regulatory approaches are inappropriate in accomplishing that objective."[33] The regulations further state that "[EPA] Regional Administrators may require that State WQM plans be updated as needed."[34] EPA has apparently left itself the option to override those state nonregulatory programs determined to be ineffective and require a regulatory approach in abating NPS pollution.

Virginia's Nonpoint Source Control Strategy

As discussed above, the Clean Water Act was the primary impetus behind the initiation of areawide planning in Virginia and throughout the nation. Further, a lawsuit brought against EPA by the Natural Resources Defense Council clarified the fact that the states were responsible for areawide planning for those areas not initially designated as having substantial

---

[31] 33 U.S.C.A. § 1315 (b) (1978).

[32] 40 C.F.R. § 130.8 (a) (1985).

[33] Id at § 130.6 (c) (4) (ii).

[34] Id at § 130.6 (e).

water quality problems.[35] In this case, the District of Columbia District Court also held that federal funding should be provided to the states to do the additional 208 planning.[36] In response, the State Water Control Board (SWCB) determined that, since point sources were being adequately dealt with under the NPDES program, the primary need was for water quality planning to address nonpoint sources of pollution.[37]

As part of this planning, the SWCB's initial efforts consisted of four elements: an assessment of local perceptions of the NPS problem, development of a series of Best Management Practices Handbooks, a statewide public participation program and a series of technical studies of NPS pollution (the most notable of which took place at Smith Mountain Lake). In addition, in 1976, a State Policy Advisory Committee (SPAC) was formed, consisting of 45-50 representatives from the general public, the state legislature, state and federal agencies and state academic institutions. Since 1976, the following additional projects have been undertaken by the SWCB as part of the statewide NPS pollution abatement program:

- A three-phase statewide assessment of potential nonpoint source problem watersheds, with the U.S. Soil Conservation Service conduct-

---

[35] N.R.D.C. v. Train, 396 F. Supp. 1386 (DC DC 1975).

[36] Virginia State Water Control Board, Water Quality Management Planning in Virginia under Section 208, Public Law 92-500---1973-1983 (State Water Control Board Information Bulletin 555), Virginia State Water Control Board, Richmond, Virginia, August, 1984, pp. iii-v.

[37] Id.

ing the agricultural assessment. In the third phase, 26 watersheds were described as having high pollution potential and proposed remedial actions were outlined and costs estimated.

- Two water supply lake and reservoir watershed protection studies;
- A Forestry BMP Education and Implementation Program;
- Potomac Embayment Studies;
- Brochures highlighting BMP's for specific agricultural commodities;
- Several BMP demonstration projects;
- Technical evaluation of selected agricultural BMP's;
- Economic evaluation of installing BMP's on an agricultural watershed;
- A citizen participation project;
- A study of the Chowan River Basin in Virginia;
- Numerous public participation projects; and

- Coordination of areawide planning activities with State planning.[38]

SWCB's efforts so far have focused on the gathering of information and the education and involvement of the public---a logical first step toward controlling NPS pollution statewide. Because this paper is focusing on **urbanizing** areas of the state, it is also noteworthy that the bulk of the SWCB efforts has been directed toward agricultural NPS pollution.

SPAC subcommittees produced the series of BMP Handbooks, which make up the heart of the State Nonpoint Source Pollution Control and Abatement program today.[39] A total of six handbooks were produced, covering five of six categories of nonpoint pollution: agriculture, forestry, hydrologic modifications, sources affecting groundwater and urban areas.[40] Five of these handbooks describe the most effective structural and nonstructural best management practices available to mitigate the specific kinds of NPS pollution addressed. In addition, a Management Handbook was produced that sets forth the overall state Nonpoint Source Pollution Control and Abatement program.

---

[38] Id.

[39] Id.

[40] A sixth handbook on surface mining was deleted from consideration after the U.S. Congress enacted the Surface Mining and Reclamation Act of 1977. This act initiated a **regulatory** (rather than voluntary) program over NPS pollution stemming from surface mining operation operations. [Virginia State Water Control Board, 1984 Annual Report: Best Management Practices Program for Abatement of Nonpoint Source Pollution in Virginia (State Water Control Board Information Bulletin 562), Virginia State Water Control Board, Richmond, Virginia, June, 1985, pp. 2-3.]

The most significant aspect of the overall state NPS Pollution Control and Abatement program is that it is a purely voluntary program. As stated in the "Best Management Practices Handbook,"

> In the absence of a demonstrated cause and effect relationship between land use activities, nonpoint source pollution, and water quality problems in State waters and also due to the lack of documentation concerning the effectiveness of BMP's to reduce nonpoint source pollution, **the SWCB has elected to pursue a non-regulatory nonpoint source control strategy** for those sources not already controlled by regulatory programs.[41] (emphasis added)

Recent discussions with SWCB personnel indicate that this course will not be altered in the near future.[42] At present, SWCB is taking the approach of educating and encouraging the citizens of Virginia to initiate measures to control NPS pollution.[43] Nevertheless, the SWCB clearly warns those who would not take this present freedom seriously: "If substantial progress is not made under the voluntary approach, it is probable that a regulatory program will be initiated under the law."[44]

Although SWCB has overall responsibility for the state NPS program, it has delegated specific aspects of the program to other state agencies. SWCB maintains responsibility for those state urban areas already developed while the Division of Soil and Water Conservation is the lead agency

---

[41] Virginia State Water Control Board, Best Management Practices Handbook---Management (State Water Control Board Planning Publication 322), Richmond, Virginia, 1981, p. I-2.

[42] Interview with M. Leon Musselwhite, Engineer, Office of Water Resources Planning, Virginia State Water Control Board, Richmond, Virginia (August 30, 1985).

[43] Id.

[44] Management Handbook, p. iii.

for those urban areas considered to be "undergoing construction and developing."[45] This decision was made because the Division was already involved in monitoring temporary NPS pollution covered under the Erosion and Sediment Control Law.[46]

In a Memorandum of Understanding between the SWCB and the Division, the Division (besides being the designated agency for the Virginia Agriculture Water Quality Management Plan) is responsible "for implementation of the Virginia Urban Water Quality Management Plan as it pertains to urban land disturbing activities."[47] The memorandum goes on to state, "The [Division] will promote the use of Urban Best Management Practices (BMP's) for erosion and sediment control and stormwater management through its administration of the Virginia Erosion and Sediment Control Law and through the implementation of an education program."[48] Therefore, regulation of NPS pollution in developing urban areas appears to consist almost entirely of local administration of the Erosion and Sediment Control Law. Because the Erosion and Sediment Control Law only regulates **temporary** NPS pollution emanating from construction sites and does not address NPS pollution after an area is urbanized, the state program is incomplete. Therefore, it is necessary to discuss the "other side" of

---

[45] Id at IV-3.

[46] Id.

[47] Id at IV-14.1.

[48] Id.

the state Urban NPS Program, that administered by the SWCB, to see exactly what it covers.

As stated in the Management Handbook, "The local governing body will be encouraged to sign a Memorandum of Understanding with the SWCB to develop and implement a program to reduce nonpoint pollution from areas of existing development under its jurisdiction."[49] An important part of this agreement is the annual report made by the local jurisdiction to the SWCB. Examples of these documents are found in APPENDIX A.[50] The Urban BMP Handbook provides a significant amount of technical data on the various types of BMP's applicable to these urbanized areas.[51]

Although this program only applies to "areas of existing development,"[52] nevertheless, the SWCB encourages localities to take advantage of the "greater flexibility involved in dealing with the problem when the time and opportunity are available to plan for and incorporate BMP's and other

---

[49] Id at IV-4.

[50] Id at pp. IV-17 to IV-21.

[51] To alleviate any confusion, it is worth noting that the Virginia Erosion and Sediment Control Handbook is the basic reference to localities in the administration of local erosion and sediment control programs. [Virginia Soil and Water Conservation Commission, The Virginia Erosion and Sediment Control Handbook, Virginia Soil and Water Conservation Commission, Richmond, Virginia, 1980.] The Urban BMP Handbook, on the other hand, is a useful reference containing information on urban BMP's, other than erosion and sediment control-type BMP's.

[52] Management Handbook, p. IV-3.

measures into new development."[53] The SWCB recommends the use of a variety of techniques, such as land-use controls under zoning and subdivision ordinances, tax incentives and planning and capital improvements.[54] Nevertheless, these encouragements and recommendations do not appear to be formally incorporated into the state program. Therefore, it appears that a state program does not exist which addresses future NPS pollution abatement in areas of the state presently undergoing urbanization.

The State Water Control Law

> It is the policy of the Commonwealth of Virginia and the purpose of this law to: (1) protect existing high quality state waters and restore all other state waters to such a condition of quality that any such waters will permit all reasonable public uses and will support the propagation and growth of all aquatic life, including game fish, which might reasonably be expected to inhabit them, (2) safeguard the clean waters of the State from pollution, (3) prevent any increase in pollution, (4) reduce existing pollution.[55]

This quote from the Code of Virginia states the purpose of the Virginia State Water Control Law. In another section of the Code entitled, "State Policy as to Waters," water is defined as including "all waters, on the surface and under the ground, wholly or partially within or bordering the

---

[53] Id at IV-5.

[54] Id.

[55] Va. Code Annotated § 62.1-44.2 (1982).

State or within its jurisdiction and which affect the public welfare."[56]

With this definition, the Code states:

> (a) Such waters are a natural resource which **should be regulated by the State.** (b) The **regulation,** control, development and use of waters for all purposes beneficial to the public are within the jurisdiction of the State which in the exercise of its police powers may establish measures to effectuate the proper and comprehensive utilization and protection of such waters . . . (d) The public welfare and interest of the people of the State require the . . . conservation and protection of water resources **together with protection of land resources, as affected thereby.**[57] (emphasis added)

The State Water Control Board is given the authority

> to establish such standards of quality and policies for any state waters consistent with the general policy set forth in this chapter . . .[t]o adopt such **regulations** as it deems necessary to enforce the general water quality management program of the Board in all or part of the Commonwealth.[58] (emphasis added)

SWCB apparently has all of the legislative authority it needs to promulgate an extensive, regulatory program to control nonpoint source pollution, should it ever determine that such an approach is necessary.

The Virginia Erosion and Sediment Control Law

In 1974 the Virginia General Assembly enacted the 1974 Erosion and Sediment Control Law in response to a rising concern over erosion and sediment-laden runoff emanating from the state's urbanizing areas. This law regulates "land disturbing activities," within certain limitations,

---

[56] Id at § 62.1-10 (a) (1982).

[57] Va. Code Annotated § 62.1-11 (1982).

[58] Id at § 62.1-44.15 (3a) (10) (Supp. 1985).

and directs the state Soil and Water Conservation Commission[59] to implement a statewide program, establishing "minimum standards, guidelines and criteria for the effective control of soil erosion, sediment deposition and nonagricultural runoff."[60] Since the Law also points to the General Assembly's concern over the "rapid shift in land use from agricultural to nonagricultural uses [which] has accelerated the processes of soil erosion and sedimentation,"[61] the emphasis of this statute is clearly on construction activities in urbanizing areas of the state.

Under the Erosion and Sediment Control Law, the primary regulatory mechanism is the requirement for development and implementation of an erosion and sediment control plan for every "land-disturbing activity" as defined by the Act.[62] Exceptions to the Act's definition of "land-disturbing activities" include agricultural, silvicultural, and horticultural activities; mining; disturbed areas for commercial development less than 10,000 square feet; and construction areas disturbed for single-family homes unless constructed as part of a subdivision development.[63] Although

---

[59] As of January 1, 1985 the name of the Virginia Soil and Water Conservation Commission was changed to the Virginia Soil and Water Conservation Board with administrative functions and technical expertise "as are necessary for the execution of functions by the [Board]" to be provided by the Division of Soil and Water Conservation under the Department of Conservation and Historic Resources. [Va. Code Annotated § 21-6 and § 21-7 (Supp. 1985).]

[60] Va. Code Annotated § 21-89.4 (1983).

[61] Id at § 21-89.2 (1983).

[62] Id at § 21-89.6 (1983).

[63] Id at § 21-89.3 (1983).

the Division of Soil and Water Conservation oversees the statewide Erosion and Sediment Control Program, regulation of "land-disturbing activities" takes place at the local level. Further discussion of the Erosion and Sediment Control Law therefore will take place under the "Local Role" section.

Interjurisdictional Cooperation and Mediation

Land-use activities, by their very nature, often generate effects which cross jurisdictional boundaries. Pollution from nonpoint sources is no exception to this; therefore, mechanisms to aid in the harmonious implementation of BMP's within several local jurisdictions are needed. Subsequent chapters discuss case studies which describe how interjurisdictional differences have actually been addressed in the Occoquan and South Rivanna watersheds. Nonetheless, it is useful to be aware of existing state mechanisms which might be used in mediating between local governments.

Under the Erosion and Sediment Control Law, if land-disturbing activities

> involve lands under the jurisdiction of more than one local control program, an erosion and sediment control plan may, **at the option of the applicant**, be submitted to the Commission [Division of Soil and Water Conservation] for review and approval rather than submission to each jurisdiction concerned.[64] (emphasis added)

---

[64] Id at § 21-89.6 (a).

Only BMP's falling under the authority of the Erosion and Sediment Control Law are applicable.

Another state statute exists, however, which provides a vehicle for mediating a much broader range of issues between local governments. The Commission on Local Government has the power "To serve as a mediator between local governments."[65] To date, the Commission has not been used to mediate between local jurisdictions over BMP issues but is primarily oriented to boundary disputes between localities (such as when a town or city attempts to annex lands from a county). Nevertheless, in the words of M. H. Wilkinson, Executive Director or the Commission on Local Government:

> I am of the opinion that the Commission represents a **unique resource** which the Commonwealth might use in a **wide variety of local and interlocal concerns**. I think the Commission's utility rests upon its technical capacity to deal with local and interlocal issues as well as its mediation services.[66] (emphasis added)

Another mechanism exists, however, which **has** seen employment in Virginia with regard to interjurisdictional urban NPS pollution issues. In 1968, the General Assembly enacted the Virginia Area Development Act which divided the state into 22 planning districts.[67] Within each planning dis-

---

[65] Id at § 15.1-945.3 (3) (Supp. 1985).

[66] Letter from M. H. Wilkinson, Executive Director of the Virginia Commission on Local Government, dated July 25, 1985, sent in response to a query about the Commission's utility as an mediator between local Virginia jurisdictions over BMP issues.

[67] Va. Code Annotated § 15.1-1400 et seq (Supp. 1985).

trict, a Planning District Commission (PDC) is organized by written agreement of two or more local jurisdictions which account for at least 45% of the district's population.[68] All 22 districts now have PDC's which are supported by contributions of the member jurisdictions and state grants of up to 25 cents per capita ($20,000 minimum).[69] Each PDC is responsible for the development of a comprehensive plan to meet the economic, physical and social needs of the district, which must then be approved by both the state and the localities concerned.[70] The state law does not empower PDC's to operate programs or services unless specifically authorized by the General Assembly.[71] To date, only two PDC's have been granted this authority.[72] In their intended service as planning bodies, however, PDC's have proven to be useful in assisting Virginia's local governments in the study and development nonpoint pollution abatement measures.[73]

---

[68] Id at § 15.1-1403 (a) (Supp. 1985).

[69] League of Women Voters of Virginia, Your Virginia State Government, League of Women Voters of Virginia, Richmond, Virginia, 1983, p. 45.

[70] Id.

[71] Va. Code Annotated § 15.1-1405 (a) (Supp. 1985)

[72] The Lenowisco and Cumberland Plateau PDC's in southwestern Virginia were authorized to operate limited programs for waste disposal and stream clearance. [See Va. Code Annotated § 15.1-1405 (a) (Supp. 1985).]

[73] For example, see Northern Virginia Planning District Commission, Guidebook for Screening Urban Nonpoint Pollution Management Strategies, Northern Virginia Planning District Commission, Annandale, Virginia, November, 1979.

Although the Area Development Act limited the ability of PDC's to implement programs, it also authorized the establishment of regional service districts (RSD's)[74] for the purpose of providing certain services on an areawide level. RSD's can only be established on the initiative of local governments and would operate under a charter much like a city charter.[75] To this date, no service districts have been established. Potential for the use of RSD's in implementing BMP's across political boundaries appears high, specifically in the employment of structural off-site BMP's. However, for reasons which will be discussed in Chapter Three, such is not the case.

THE LOCAL ROLE

Control of NPS pollution takes place at the local level. The federal government has declared NPS pollution to be a function of state and local management. Because Virginia's NPS program is a voluntary one, approaches to NPS pollution abatement in the urbanizing areas of Virginia are generally left to the discretion of local governments. A very significant factor which dictates how local governments actually function is Dillon's Rule.

---

[74] Va. Code Annotated § 15.1-1420 et seq (1981).

[75] Id.

Dillon's Rule

It has often been said in Virginia that, "Cities and counties are creatures of the State, and they have only that authority conferred on them by the State."[76] The origin of this statement is a rule enunciated by a New York judge, John F. Dillon, and adhered to in the Commonwealth of Virginia. Dillon's rule places very narrow limits on powers enjoyed by local governments, and is an important factor in local government operations.

The Constitution of the United States creates a federal government of enumerated powers. This means that the federal government only has those powers expressly defined in the federal Constitution and the states are free to exercise all other power as necessary. At the local level, an analogous rule is the "home rule" doctrine which allows localities to exercise any power not expressly denied by the state government. Dillon's Rule, however, is essentially the opposite of "home rule" and, as stated by the Virginia Supreme Court, it "provides that local governing bodies have only those powers that are expressly granted, those that are necessarily or fairly implied from expressly granted powers, and those that are essential and indispensable."[77]

---

[76] Yearwood, Richard M., Planning and Land Use Controls: Zoning and Subdivision Regulations in Virginia, Center for Urban and Regional Studies, Virginia Polytechnic Institute and State University, Blacksburg, Virginia, 1971, p. 17.

[77] Tabler v. Fairfax County, 221 Va. 200, 269 S.E. 2d 358 at 361 (1980).

As an example of this, when Fairfax County enacted an ordinance requiring a five cent deposit on all nonalcoholic beverage containers in 1977, the Virginia Supreme Court in 1980, in reversing the decision of a lower court, stated that "the County Board did not have **legislative authority** to enact legislation setting forth a minimum cash refund value on containers for nonalcoholic beverages"[78] (emphasis added). Clearly then, the ability of Virginia's local governments to require private landowners to implement BMP's must first be evaluated in light of Dillon's Rule to establish whether legislative authority exists.[79] For this reason, discussion of legislative authority will be a major theme in this paper. A statute mentioned in the previous section, which gives localities the legislative authority to regulate polluted runoff from construction sites in developing areas, is the Virginia Erosion and Sediment Control Law.

The Virginia Erosion and Sediment Control Law

While the Division of Soil and Water Conservation is responsible for the development of the overall state erosion and sediment control program, enforcement of the Erosion and Sediment Control Law is the responsibility of the state's local governments and soil and water conservation districts. (After the Soil and Water Conservation Commission developed the

---

[78] Id.

[79] For further reading on the Dillon's Rule in Virginia, see Edwards, Paul G., "Dillon's Rule Keeps Assembly Clogged with Local Bills," in The Washington Post, February 16, 1976.

statewide program in 1974, all localities were required to adopt a local program and have it approved by the Commission within 12 to 18 months.) Any party engaging in a "land-disturbing activity" must submit a plan to the local plan approving authority which "shall . . . assure that the entire unit or units of land will be so treated to achieve the conservation objectives."[80] Localities may charge a processing fee to defray costs, up to $300.00 and may make periodic inspections, "as are deemed necessary to determine whether the soil erosion and sediment control measures required by the approved plan are being properly performed."[81]

Further, local governments may require security for performance such as a "reasonable performance bond, cash escrow, letter of credit . . . to ensure that measures could be taken by the county, city or town at the applicant's expense should he fail . . . to initiate or maintain appropriate conservation action."[82] Violations of this law "shall be deemed a misdemeanor and upon conviction shall be subject to a fine not exceeding $1,000 or 30 days imprisonment for each violation or both."[83] Finally, localities also have the authority to establish more stringent standards."[84]

---

[80] Va. Code Annotated § 21-89.3 (f) (1983).

[81] Id at § 21-89.8 (b).

[82] Id at § 21-89.7.

[83] Id at § 21-89.11 (a).

[84] Id at § 21-89.12.

Zoning and Subdivision Regulations

The most definitive source of local authority in the Virginia Code for the implementation of permanent (other than erosion and sediment control) BMP's lies within the section of the Virginia Code entitled, "Planning, Subdivision of Land and Zoning."[85] Under the heading of "**Matters to be considered in drawing and applying zoning ordinances and districts**," the Code states that, "Zoning ordinances and districts shall be drawn and applied with reasonable consideration for . . . [among other things] the conservation of natural resources."[86] Further, one of the stated purposes of local zoning ordinances is the promotion of "the health, safety or general welfare of the public."[87] Local governments apparently have the necessary legislative authority to enact ordinances targeted on the protection of water from nonpoint sources; to protect water either as a natural resource or to protect the public health and welfare.

Tax Law

Another source of authority to local governments is the Virginia Tax Code. Although the levying of taxes is primarily for the purpose of raising revenues for governments to operate, taxes can also be used to provide negative and positive incentives to produce desired actions on the part

---

[85] Id at § 15.1-427 et seq (Supp. 1985).

[86] Id at § 15.1-490.

[87] Id at § 15.1-489.

of the parties being taxed. Energy credits and deductions for charitable contributions are two common examples of how federal and state income tax codes are used to achieve certain desirable actions on the part of individual citizens.

The Virginia Constitution states, "All property, except as hereinafter provided, shall be taxed."[88] The Virginia Code further delegates this power to the cities and towns[89] and counties[90] of Virginia. Further, the Code provides for special assessments for the purpose of preserving natural resources:

> An expanding population and reduction in the quantity and quality of [open space] make the preservation of such real estate a matter of public interest. It is, therefore, in the public interest to encourage the preservation and proper use of such real estate in order to assure . . . [the conservation of] natural resources in forms which will prevent erosion [and] **to protect adequate and safe water supplies.** . . . [Therefore] it is the intent of this article to . . . permit the assessment and taxation, of such real estate in a manner that will promote the preservation of it ultimately for the public benefit.[91](emphasis added)

The tax code also allows for the exemption or partial exemption of certified pollution control equipment and facilities.[92] Such facilities are defined by the code as being "any property, including real or personal property, equipment, facilities or devices, used primarily for the pur-

---

[88] Constitution of Virginia, 1971, Article X, § 1.

[89] Va. Code Annotated § 58.1-3005 (1984).

[90] Id at § 58.1-3001.

[91] Id at § 58.1-3229.

[92] Id at § 58.1-3660.

pose of abating or preventing pollution of the atmosphere or waters of the Commonwealth."[93] Structural BMP's would appear to fall into this category. Although tax incentives are not presently enjoying wide application, the state tax law does nevertheless appear to provide Virginia localities with a useful tool which can be used to encourage implementation of various BMP's by private parties.

Financing BMP's

A number of possibilities for financing BMP's exist and are being used in Virginia. Among the alternatives are the creation of drainage districts and levying of special property taxes, use of general government revenues, municipal bonds, special tax assessments on benefited property, federal loans, state and federal grants-in-aid and voluntary contributions of material and/or services by developers.[94] These are common methods for financing public works projects and will not be discussed here, except to acknowledge their potential application to BMP construction. In fact, these methods do not yet appear to be enjoying wide application in Virginia, simply because structural BMP's have not been widely constructed. Specific discussion on how several localities have financed BMP construction will occur in subsequent chapters.

---

[93] Id.

[94] American Public Works Association Research Foundation, Urban Stormwater Management: Special Report No. 49, American Public Works Association, Chicago, Ill., 1982, p. 260.

CONSTITUTIONAL PROTECTION OF PROPERTY RIGHTS

One of the accepted purposes of government (or collective action in general) is to maximize net total welfare. Because net total welfare cannot be maximized without some infringement on individual welfare, property rights of private citizens must often meet with certain restrictions. Nevertheless, the protection of individual private property rights in the United States has been an important thread woven into the fabric of government since its earliest days. "Property must be secured," declared John Adams, "or liberty cannot exist." The Fifth Amendment to the federal Constitution states, "nor shall private property be taken for public use, without just compensation." The Virginia Constitution states, "That no person shall be deprived of his life, liberty, or property without due process of law; that the General Assembly shall not pass any law . . . whereby private property shall be taken or damaged for public uses, without just compensation."[95] Therefore, when considering any requirements imposed on landowners to implement BMP's (structural or nonstructural), the issue of protection of property rights as a limitation on the powers of the state must be taken into consideration.

---

[95] Constitution of Virginia, 1971, Article I, § 11. See also Raleigh Const. Corp. v. Faucett, 140 Va. 126, 124 S.E. 433 (1924).

Governmental Powers

State powers which can limit the enjoyment of individual property rights fall into three basic categories: taxation, police power and eminent domain condemnation. Taxation is the assessment of "a rate or sum of money . . . on a person or property for the support of the government, and commonly levied upon assets or real property (property tax), or income derived from wages, etc. (income tax), or upon the sale or purchase of goods (sales tax)."[96] Taxation is a method often used to **encourage** private parties to follow desired courses of action.

The police power, on the other hand, is a governmental power that **coerces** private parties to do or not do certain things, in the public interest. It is the "inherent power of state governments, often delegated in part to local governments, to impose upon private rights those restrictions that are reasonably related to promotion and maintenance of the health, safety, morals, and general welfare of the public."[97] The police power, therefore, is clearly a regulatory power. Since the state nonpoint pollution program in Virginia is voluntary, the use of the police power in enforcing the implementation of structural BMP's is most significant to localities that have BMP ordinances, in the enforcement of the Erosion

---

[96] Gifis, Steven H., Barron's Law Dictionary, 1984, Barron's Educational Series, Inc., Woodbury, New York, 1984, p. 470.

[97] Gifis p. 350.

and Sediment Control Law, and in the enforcement of zoning and subdivision regulations.

Eminent domain involves the actual taking of private property in the public interest. This governmental power is also rightly called the power of condemnation because it involves the condemnation or "taking of private property for public use such as building a highway"[98] (or structural BMP). Its relevance is most closely associated with structural off-site BMP's, since such regional facilities are more likely to be constructed by local governments.

Private Versus Public Interests

In no other area of case law is there more discussion of the balancing of private rights against public rights than in the area of zoning. In 1926 the United States Supreme Court in Village of Euclid v. Ambler Realty Co., stated,

> Until recent years, urban life was comparatively simple; but, with the great increase and concentration of population, problems have developed, and constantly are developing, which require, and will continue to require, additional restrictions in respect of the use and occupation of private lands in urban communities.[99]

This case is the landmark federal case upholding the constitutionality of zoning as an acceptable use of the police power. It indicates the

---

[98] Gifis, p. 85.

[99] Village of Euclid v. Ambler Realty Co., 272 U.S. 365 at 386 (1926).

conceptual direction the court took in 1926 and continues to take to this day.

The Virginia Supreme Court made a similar ruling just two months before the Euclid ruling in the case Goreib v. Fox.[100] Here the Virginia court upheld the right of localities to exercise zoning power, ". . . to protect the public against the improper use of private property to the injury of the public interest."[101] The Goreib ruling was upheld in a 1976 Virginia Supreme Court case, Byrum v. Orange County, where the court stated,

> Local governing bodies, because of their knowledge of local conditions and the needs of their individual communities, are allowed wide discretion in the enactment and amendment of zoning ordinances . . . [therefore] a court should not substitute its judgment . . . unless there has been a clear abuse of power."[102]

The language used in this recent ruling indicates that the Virginia court not only maintains its position outlined in Goreib v. Fox, but places even more emphasis on the discretion accorded to localities in the enactment of zoning ordinances. Nevertheless, certain judicial authorities in Virginia have suggested that, in spite of what the court says, it often acts differently. BeVier and Brion have stated,

> In its review of local zoning decisions, the Virginia Supreme Court seems plainly to have expanded the judicial involvement in land use policy making beyond that which would be strictly necessary to guard individual constitutional rights against unwarranted legislative intrusion. That this expansion of the judicial role has taken place is apparent from the fact that the Court in almost every conceivable context subjected legislative zoning to intensive judicial scrutiny

---

[100] Goreib v. Fox, 145 Va. 554, 134 S.E. at 914 (1926).

[101] Id at 134 S.E. 914 at 916.

[102] Byrum v. Orange County, 217 Va. 37, 225 S.E. 2d at 371 (1976).

and freely substituted its own land use policies for legislatively chosen ones.[103]

Opposing evidence such as this only serves to illustrate the fact that the balancing of private versus public interests is often a murky topic.

The major issue of concern involving the enforcement of a particular zoning or subdivision ordinance is whether such an action constitutes a "taking" of private property without just compensation. In the Euclid case, the Supreme Court established a test in which the general public welfare is balanced against individual private property rights. As pointed out above, this balancing test is not well-defined. The Court stated in the Euclid case, "The line which in this field separates the legitimate from the illegitimate assumption of power is not capable of precise delimitation."[104] Nonetheless, this balancing test, cloudy as it may periodically become, is still supported by the U.S. Supreme Court.[105] In a recent case the Court stated that the "taking" issue "necessarily requires a weighing of private and public interests."[106]

---

[103] BeVier, Lillian R. and Brion, Denis J., Judicial Review of Local Land Use Decisions in Virginia, Institute of Government, University of Virginia, Charlottesville, Virginia, 1981, p. 132.

[104] Euclid v. Ambler, 272 U.S. 365 at 387-388.

[105] An in-depth discussion of the balancing of public versus private rights is beyond the scope of this paper. This is a very complex issue and those desiring to pursue it further are directed to Frank I. Michelman's article, "Property, Utility and Fairness: Comments on the Ethical Foundations of 'Just Compensation' Law," in the Harvard Law Review, Vol. 80, No. 6, April 1967, pp. 1184-1262.

[106] Agins v. City of Tiburon, 447 U.S. 255 at 264 (1980).

LIABILITY

A study of the institutional aspects of nonpoint pollution control measures would be incomplete without consideration of potential issues of liability. As is well known, liability is "an obligation to do or refrain from doing something; a duty which eventually must be performed; an obligation to pay money."[107] A finding of liability generally results from lawsuits based on tort law.[108] As implied in the definition of liability, a court may grant a plaintiff two types of remedies in a tort case: an injunction or an award of monetary damages. The fact that such limits can potentially be imposed on landowners could place certain constraints on the successful implementation of BMP's or require their use.

Four basic tort law theories relative to land use may be used by a court to determine liability: negligence, strict liability, trespass and nuisance. An additional area of tort law which has clear application here is the attractive nuisance doctrine. Where publicly-owned facilities are involved, a potential limitation on application of these theories of liability is the concept of sovereign immunity.[109] A brief discussion will

---

[107] Gifis, p. 269.

[108] For a more complete understanding of tort law see Prosser, William L., Handbook of the Law of Torts, 4th ed., West Publishing Co., St. Paul, Minn., 1971. Prosser (p. 2) defines a tort as "a civil wrong, other than a breach of contract, for which the court will provide a remedy in the form of an action for damages."

[109] For a more thorough discussion of these theories than is presented here, the reader is refered to comprehensive works on tort law such as Prosser and/or American Law Institute, Restatement of the Law,

be made about an area of water law, diffused surface water, after these six topics of tort law have been discussed. Virginia adheres to the "modified common enemy doctrine" for diffused surface water. Although this is not a tort theory, it deserves attention because of its potential impact on tort cases involving BMP's.

Negligence

From a plaintiff's point of view, the most difficult means of proving the liability of a defendant is by basing a case on negligence. Negligence is the "failure to exercise that degree of care which a person of ordinary prudence (a **reasonable man [person]**) would exercise under the same circumstances."[110] Essentially, the court must answer the question, "Was the injury a foreseeable consequence of the defendant's action?" Because the burden of proof lies with the plaintiff, this is usually a difficult question to answer affirmatively.

If, however, the court accepts the doctrine of **res ipsa loquitur**, the burden of proof regarding the exercise of proper care is shifted to the defendant and the plaintiff's chances of winning the case are much better. The doctrine of **res ipsa loquitur** (meaning, "the thing speaks for

---

Second, Torts, 7 Vols., American Law Institute Publishers, St. Paul, Minn., 1979.

[110] Gifis, p. 309.

itself"[111]) creates a rebuttable presumption of negligence on the part of the defendant. Four basic elements are required in order for this approach to be accepted by a court: (1) the defendant must be in exclusive control of the injury-causing mechanism, (2) the accident must be one which would not normally occur in the absence of negligence, (3) the plaintiff (injured party) must not have contributed to the injury in any way and (4) the evidence must be more easily accessible to the defendant than to the plaintiff.[112] An applicable example occurred recently in Arkansas in which an earthen dam broke, causing damage to downstream parties. The court accepted the **res ipsa** doctrine, and the owners of the dam were held negligent.[113]

The fourth requirement, however, makes the application of **res ipsa** fairly restrictive and is not required in all states. Nonetheless, it does appear to be accepted in the Virginia courts. In 1937, a case involving a broken city water meter which caused flooding damage to a private party was heard on appeal by the Virginia Supreme Court of Appeals and the original decision reversed because this fourth requirement was not met.[114] Therefore, the utilization of the **res ipsa loquitur** doctrine will be more

---

[111] Gifis, p. 407.

[112] "Annotation: Res Ipsa Loquitur as Applicable in Actions for Damage to Property by the Overflow or Escape of Water," American Law Reports Annotated Third Series, Vol. 91, Lawyers Cooperative Publishing Co., and Bancroft-Whitney Co., San Francisco, Calif., 1979, pp. 186-273.

[113] Dye v. Burdick, 553 S.W. 2d 833 (1977, Ark).

[114] Richmond v. Hood Rubber Products Co., 168 Va. 11, 190 S.E. 95 (1937).

difficult for a plaintiff in Virginia than in certain other states due to the added requirement that the evidence of the nature and source of injury be more accessible to the defendant.

Strict Liability

While negligence was the most difficult means of proving liability of a defendant, strict liability provides the plaintiff with the greatest chance of winning a tort case. Strict liability is liability without fault. "Often in tort law one who engages in an activity that has an inherent risk of injury, such as those classified as **ultrahazardous activities**, is liable for all injuries proximately caused by his or her enterprise, even without a showing of negligence."[115] Traditionally, ultrahazardous activities have included the use of explosives, the storage of dangerous substances and the harboring of wild animals.[116]

For the most part, a tort case in which the court accepts strict liability as the basis for negligence will result in a judgment for the plaintiff. However, because the theory is restricted to ultrahazardous activities, its application to BMP's is dubious. The majority of cases involving the failure of impoundments (usually larger than even the largest stormwater detention basin) have rejected the strict liability theory and have re-

---

[115] Gifis p. 458.

[116] Prosser pp. 505-516.

quired proof of negligence.[117] In fact, in the above-cited Arkansas case involving a dam failure where the court employed the **res ipsa loquitur** doctrine, the presiding judge specifically stated that "We find the rule of strict liability inapplicable."[118]

Trespass

The theory of trespass, however, exist somewhere mid-spectrum between negligence and strict liability in terms of its likelihood of generating a finding of liability. Traditionally, trespass has involved unlawful injury to a person and/or his property by means of immediate force or violence. Today, it is more likely to connote a wrongful interference with the possession of property, generally involving the unlawful entry thereon.[119] Therefore, the unentreated movement of water (polluted or otherwise) onto one's property can constitute a trespass. This common law remedy is available to a party upon whose property water, debris or sediment has entered by way of a malfunctioning BMP.

---

[117] "Annotation: Applicability of Rule of Strict or Absolute Liability to Overflow or Escape of Water Caused by Dam Failure," American Law Reports Annotated Third Series, Vol. 51, Lawyers Cooperative Publishing Co., Rochester, N.Y. and Bancroft-Whitney Co., San Francisco, Calif., 1973, pp. 965-75.

[118] Dye v. Burdick, 553 S.W. 2d 833 at 840 (1977, Ark)

[119] Gifis p. 488.

Precedent for the use of the trespass doctrine in the movement of polluted water onto another's property exists in Virginia.[120] Trevett v. Prison Assoc. of Virginia involved a state prison for youthful criminals dumping waste into a river, causing this same refuse to be deposited onto the property of a downstream riparian proprietor.[121] The court held the discharger liable for injury to the plaintiffs. Although this case was also based on the riparian doctrine of water law,[122] it serves as precedent in Virginia for the use of trespass as a theory in cases involving the movement of polluted water onto another's property.[123]

Nuisance

The theory of nuisance could also potentially be employed against the owner of property upon which a BMP is creating a legally-defined nuisance. Broadly characterized as "the defendant's interference with the

---

[120] Michie's Jurisprudence of Virginia and West Virginia, Vol. 20, The Michie Company, Charlottesville, Virginia, 1979, § 19.

[121] Trevett v. Prison Asso. of Virginia, 98 Va. 332, 36 S.E. 373 (1900). See also "Annotation: Industrial Water Pollution---Relief," American Law Reports Annotated Third Series, Vol. 39, Lawyers Cooperative Publishing Co., Rochester, N.Y. and Bancroft-Whitney Co., San Francisco, Calif., 1971, p. 925.

[122] In states, such as Virginia, where the riparian doctrine is recognized, only riparian owners may bring tort cases such as this, to bar, involving pollution of said waters.

[123] See also Shoffner v. Sutherland, 111 Va. 298, 68 S.E. 996 (1910) and McKinney v. Trustees of Emory & Henry College, 117 Va. 763, 86 S.E. 115 (1915).

plaintiff's interests,"[124] nuisance has potential for application to BMP cases similar to the one described above. In fact, the Trevitt case primarily involved the use of the nuisance theory (in addition to the theory of trespass and the riparian doctrine) as a basis for the finding of liability of the defendant by the court.[125] In application, the court chooses a remedy by determining a balance between the extent of harm done and the societal value of the activity causing the harm.[126] Negligence need not be a requisite factor in determining whether or not a nuisance exists but often is used.[127]

Attractive Nuisance

The "attractive nuisance" doctrine (also called the "turntable" doctrine) could potentially be of concern to landowners who maintain BMP's that might be an attraction to children.[128] Under this doctrine, a landowner who maintains on his property a dangerous instrumentality, which also is

---

[124] Prosser p. 571

[125] "Annotation: Industrial Water Pollution---Relief," American Law Reports Annotated Third Series, Vol 39, Lawyers Cooperative Publishing Co., Rochester, N.Y. and Bancroft-Whitney Co., San Francisco, Calif., 1971, p. 923.

[126] "Annotation: Nuisances---Balancing of Convenience," American Law Reports Annotated Third Series, Vol. 40, Lawyers Cooperative Publishing Co., Rochester, N.Y. and Bancroft-Whitney Co., San Francisco, Calif., 1971, p. 611.

[127] Cox, William E., "Waste Application to Land: The Land-Use Issue," Journal of Water Resources Planning and Management, Vol 110, No. 3, July, 1984, pp. 275-276.

[128] Restatement of Torts, 2d § 339 (1965).

likely to be an enticement to children, has a responsibility to protect potential child trespassers from harm.[129] Tort law defines nonlandowners on a particular landowner's property in one of three categories: invitees (those invited by the landowner onto his property), licensees (those whose presence on the premises is not invited but merely tolerated) and trespassers (those whose presence on the premises is neither invited nor tolerated).[130] In the case of adults, the potential for landowner liability is lowest if injury occurs to a trespasser as opposed to the other two categories.[131] With children, however, this is not the case under the doctrine of attractive nuisance.

Public Accountability and Governmental Immunity

The issue of public accountability for private damages stemming from a public undertaking involves the same concepts of tort law but may also involve the concept of governmental or "sovereign" immunity. The concept of sovereign immunity, or "the King can do no wrong," has its roots deep

---

[129] As stated in American Jurisprudence, 2d, Lawyers Cooperative Publishing Co., Rochester, N.Y. and Bancroft-Whitney Co., San Francisco, Calif., 1980, Vol 62, § 138, "Premises Liability,": "One who maintains upon his premises a condition, instrumentality, machine, or other agency which is dangerous to children of tender years by reason of their inability to appreciate the peril therein, and which may reasonably be expected to attract children of tender years to the premises, is under a duty to exercise reasonable care to protect them against the dangers of the attraction."

[130] See Gifis pp. 246, 270 and 489.

[131] Pettyjohn and Sons v. Basham, 126 Va. 72, 100 S.E. 813 (1919).

in world history, the idea of which was carried over to modern governments.[132]

In 1821 Chief Justice John Marshall declared that no suit could be prosecuted against the United States without its consent.[133] Just as the United States government adopted the doctrine of governmental immunity, in a like manner, the Virginia Supreme Court has accepted the doctrine of sovereign immunity as acknowledged in the following quotation:

> But the public also has a vital interest in the orderly administration of government, and, as a general rule, the sovereign is immune not only from actions at law for damages but also from suits in equity to restrain government from acting or compel it to act.[134]

This doctrine is most applicable to off-site BMP's, owned and maintained by local governments.

Virginia's Modified Common Enemy Doctrine for Diffused Surface Water

Although legal doctrines governing diffused surface water (runoff) fall under the category of water law, rather than tort law, since such doctrines will often play an important role in resolving liability related to stormwater. Virginia has adopted a modified version of the common

---

[132] Prosser pp. 970-971.

[133] Cohens v. Virginia, 19 U.S. 264 (1821).

[134] Hinchey v. Ogden, 226 Va. 234, 307 S.E. 2d 891 at 894 (1983).

enemy doctrine for diffused surface water. In the landmark case on this subject, Mason v. Lamb, the court stated,

> In this jurisdiction we have has adopted what is known as the modified common law rule or common enemy doctrine with respect to surface water. Under this rule surface water is considered a common enemy and each landowner, in the improvement or protection of his property, may fight it off as best he can, **subject to the qualification that he must exercise his rights not wantonly, unnecessarily, or carelessly, but in good faith and with such care as not to injure needlessly the property of the adjacent owner.** (emphasis added).[135]

In recent years, this doctrine has been upheld by the Virginia Supreme Court.[136] Most important to this discussion, however, is the fact that this doctrine may well have a significant impact on liability cases involving BMP's.

IMPACT OF INTEREST GROUPS

So far, interest groups have not played nearly as significant a role in the nonpoint source pollution issue as they did when point sources were recognized as being the major source of water pollution. One of the reasons for this, already discussed, is the fact that nonpoint pollution sources cannot readily be identified. A paper products industry dumping significant and conspicuous amounts of waste via a point source into a water body provides leaders of interest groups with a symbol and an obvious enemy to fight.

---

[135] Mason v. Lamb, 189 Va. 348, 53 S.E. 2d 7 at 10 (1949).

[136] See Seventeen, Inc. v. Pilot Life Insurance Company, 215 Va. 74, 205 S.E. 2d 648 (1974) and McCauley v. Phillips, 216 Va. 450, 219 S.E. 2d 854 (1975).

In addition, in the case of nonpoint pollution, the lack of scientific data has delayed any significant public outcry. Also, an equally important fact is that those sources identified as being major nonpoint sources, such as forestry and agriculture, already have significant lobbying organizations in place. However, interest groups such as the Natural Resources Defense Fund, which played a key role in forcing EPA to give greater attention to NPS pollution, have potential for future impact.[137]

Probably the one organization that functions best as a rallying point against nonpoint source pollution is the Association of State and Interstate Water Pollution Control Administrators (ASIWPCA). ASIWPCA is made up of state officials appointed by the state governors. Virginia's representative to ASIWPCA is Richard Burton, the Executive Director of the Virginia State Water Control Board.

Originally formed in 1962, ASIWPCA "is an independent, nonpartisan organization of State [water program] Administrators . . . [which] provides a continuing communication link between ASIWPCA, its members and the Federal establishment."[138] Represented by all of the states, as well as eight interstate agencies and three territories, ASIWPCA has the following objectives:

---

[137] N.R.D.C. v. Train, 396 F. Supp. 1386 (DC DC 1975).

[138] Association of State and Interstate Water Pollution Control Administrators, information brochure entitled, "What is ASIWPCA?," published by ASIWPCA, Washington, D.C., 1984.

- Assist governors in developing policy by providing technical information;

- Inform Congress and the Administration on the State water programs' emerging problems and future needs;

- Continue state delegation of Clean Water Act implementation;

- Provide technical and administrative expertise to Congress and the Administration in developing Federal programs and charting the future course of the water program;

- Foster State program development through exchange of technical and managerial information.[139]

In line with its objective to provide technical information, ASIWPCA has recently been working on a major fact-gathering undertaking called the "ASIWPCA Nonpoint Source Assessment Project." The project's objectives are to assess and report on the following:

- The **intensity and extent of water quality problems**, in terms of impairment of designated uses, caused by various forms of nonpoint sources of pollution.

---

[139] Id.

- The **status** of nonpoint source water quality programs in the States, using valid and consistent data.

- **Accomplishments** of nonpoint source pollution management in improving water quality.

- **Transfer of effective management technologies** among States.

- **Recommended future decisions.**[140]

After this assessment and reporting is done, the ultimate objective of ASIWPCA is to establish a "**baseline** of nonpoint source program information."[141] At the request of EPA, ASIWPCA has been using their STEP-II Report, (State's Evaluation of Progress, Phase II), to collect data from the states on the status of their nonpoint source water quality programs.[142] In light of the obvious data problem on nonpoint source pollution, this activity appears to be a useful project.

---

[140] Information flier on the "ASIWPCA Nonpoint Source Assessment Project," provided by Robbi J. Savage, Executive Director, ASIWPCA.

[141] Id.

[142] Virginia State Water Control Board, Water Quality Inventory, 305 (b) Report: Virginia, (SWCB Information Bulletin 558), July, 1984, p. 21.

CHAPTER TWO: ON-SITE BMP'S.

For the purposes of this discussion, on-site best management practices are defined as structural BMP's which are located on an individual landowner's property. Although this definition may appear limited, in fact this category probably includes most of the BMP's in existence. On-site BMP's are of two basic types: temporary measures employed on "land-disturbing activity" sites (such as silt fence, catch basins and hay bales) and more permanent structures which have as their primary purpose the mitigation of NPS pollution shortly after construction is complete (such as detention basins, grassed swales and porous pavement).

Temporary on-site BMP's are clearly the most common since they are required under the Erosion and Sediment Control Law. The short-term benefits are usually fairly obvious since the objective is to reduce excessive sediment runoff from "land-disturbing activities" (most commonly construction sites). While urbanizing areas are still "urbanizing," temporary BMP's will reduce the bulk of the nonpoint pollution created. However, as was mentioned in the introduction, the objective in implementing BMP's in urbanizing areas is not to simply reduce construction runoff but to take advantage of the flexibility afforded to planners in **developing** urban areas. Such flexibility allows local planners to effectively plan for, integrate and institute permanent measures which will

mitigate the effects of urban nonpoint pollution after the "urbanization" process has taken place.[143]

LEGISLATIVE AUTHORITY

As discussed in Chapter One, the legislative authority granted by the state to implement on-site BMP's is derived from two basic sources. In the case of temporary on-site BMP's, this authority comes from the 1974 Erosion and Sediment Control Law. The law is concerned with "land-disturbing activities . . . including, but not limited to, clearing, grading, excavating, transporting and filling land," to the exclusion of major sources of nonpoint pollution such as mining, agriculture and forestry.[144] Temporary on-site BMP's, as defined above, achieve this purpose. The Erosion and Sediment Control Law, as discussed in Chapter One, provides clear authority for local government to require BMP's for land-disturbing activity.

Requirement of permanent on-site BMP's, however, must rely on state zoning and subdivision law. Legislative intent is less specific in this case; however it can be argued that zoning and subdivision laws are written without detail so localities have the flexibility to implement zoning ordinances most applicable to their unique situations. Localities concerned about the effects of urban nonpoint pollution, beyond sediment from

---

[143] Supra Note [2].

[144] Va. Code Annotated § 21-89.3 (a) (1983).

construction sites, have relied on the zoning and subdivision regulation to require permanent on-site BMP's as a part of various types of new construction.[145]

One locality which has such an ordinance is Albemarle County.[146] Albemarle's "Runoff Control Ordinance" is unique from other runoff ordinances because it not only is concerned with mitigating peak runoff but is also focused on controlling the pollution from stormwater runoff. A strength of the ordinance is the fact that its objective is clear:

> The purpose of this article is to protect against and minimize the pollution and eutrophication of the public drinking water supply impoundments in the county resulting from land development in the respective watersheds thereof . . . This ordinance . . . shall be liberally construed to effectuate its purpose . . . The provisions hereof shall be deemed to be supplementary to any other provision of law relating to the control of land development, to the prevention of soil erosion and sedimentation, to the pollution of water or any related matter.[147]

Clearly, this ordinance goes beyond the county's erosion and sediment control ordinance.

The Albemarle County Runoff Control Ordinance requires developers to submit a plan for runoff control and to obtain a permit from the Runoff Control Official.[148] Specifically:

---

[145] Telephone interview with William K. Norris, Watershed Management Official, Albemarle/Charlottesville Office of Watershed Management, Charlottesville, Virginia (August 19, 1985).

[146] Albemarle County Code § 19.1-4 et seq. (1977).

[147] Id

[148] Id at § 19.1-7 (a).

> The runoff control official shall review plans and specifications so submitted to insure that there will be occasioned by such development no greater rate of surface water runoff than would be present in the absence of such development; and he shall further review such plans and specifications to insure that such runoff, after development, (1) will be of **no lesser quality, upon leaving the site, than would be the case in the absence of such development, or (2) will have a maximum suspended solids loading of one hundred thirty-five pounds per acre per year and a maximum total phosphorus loading of 0.68 pounds per acre per year**; whichever of the foregoing shall be less.[149] (emphasis added).

This ordinance clearly gives county engineers the authority to require that structures be specifically designed to mitigate nonpoint pollution. Discussions with county engineers reveal that this ordinance has been effective to date.[150]

Discussions with other local government engineers have revealed a tendency simply to require the emplacement of peak runoff mitigating devices, such as detention ponds, under the assumption that such structures will also control nonpoint pollution. Recent studies have shown this to be an inaccurate assumption, most particularly with regard to dry ponds.[151] The original intent on the Albemarle County Runoff Control Ordinance has been the protection of county water supplies (the South Rivanna Reservoir). Nevertheless, it provides the rest of Virginia's local governments

---

[149] Id at § 19.1-7 (b).

[150] Telephone interview with Tom Muncaster, Civil Engineer, Engineering Department, Albemarle County, Virginia, (September 19, 1985).

[151] Water Planning Division, United States Environmental Protection Agency, "Results of the Nationwide Urban Runoff Program: Executive Summary,: United States Environmental Protection Agency, Washington, D.C., December, 1983, p. 14.

with an example of an effective ordinance specifically oriented to the long-term mitigation of pollution in urban runoff.

LIABILITY

Because on-site BMP's are structural in nature, clear potential for injury to third parties exists. Landowners employing certain structural BMP's face a number of possible liability "scenarios." For example, if a contractor fails to properly maintain silt fencing or hay bales and a storm causes debris to overflow onto the property of another landowner, the contractor could be found liable under tort law for negligence (by his failure to reasonably maintain these perimeter controls) and ordered to pay monetary damages. In another case, if a landowner maintains water storage facilities on his property that cause water to seep into and causes damage to the basement of his neighbor, he could be found liable for allowing this water to trespass. Finally, another landowner may find himself liable for creating a nuisance because his grassed swale has malfunctioned and become an eyesore by developing into a muddy pool where trash collects and mosquitoes breed.

These possibilities demonstrate how nearly every conceivable type of structural BMP could, through either poor design, construction or maintenance, cause damage to third parties. As might be expected, the one structure which is most likely to result in landowner liability is the wet pond. Also, since wet stormwater detention ponds tend to be more

effective than other types of BMP's[152] and already are in wide use as single purpose stormwater detention ponds, many landowners and local governments will at least consider wet pond use in achieving the additional purpose of reducing nonpoint pollution. At the same time, wet ponds appear to offer the greatest potential for liability. Children attracted by wet ponds may drown, earthen pond embankments may fail or subsurface seepage from ponds may cause damage to a neighbor's property. The tort theories already discussed in Chapter One are applicable to these potential scenarios for landowner liability. One of these tort concepts that **may** have significant application to certain types of on-site BMP's is the attractive nuisance doctrine.

Attractive Nuisance

The attractive nuisance doctrine affects landowners who maintain "dangerous instrumentalities" on their property likely to be an attraction to children. Courts adhering to this theory will likely find such property owners liable for failure to protect children from injury, even if the children are trespassers. The attractive nuisance doctrine has had application in courts across the country although it has not received

---

[152] Department of Environmental Programs, Metropolitan Washington Council of Governments, "Urban Runoff in the Washington Metropolitan Area: Final Report, Washington D.C. Area Urban Runoff Project," December, 1983, p. xxi-xxii.

uniform acceptance. Interestingly enough, Virginia is one of seven states which rejects the doctrine.[153]

This rejection is indicated in a 1948 case, Washabaugh v. Northern Virginia Const. Co..[154] This case involved the drowning death of a nine year old boy in an artificial pond of water created on a quarry site and therefore is potentially applicable to any liability cases involving detention basin BMP's. The boy's father, as the plaintiff, claimed that the owners failed to "erect [a] fence or other barricade around the pit . . . and post appropriate warning signs."[155] As Chief Justice Hudgins stated, "the precise question is whether an artificial pond of water created in the operation of an ordinary business enterprise is such a dangerous instrumentality that the law imposes upon the owner the duty to take proper precautions to prevent children from using the same."[156] The court affirmed the lower court, finding for the defendant:

> We know boys, younger and older than plaintiff's decedent, who fish, hunt, swim, and climb trees on lands other than the lands of their parents. All of these activities are attended with some degree of peril or danger. Boys fall out of trees, and into streams and ponds. Fortunately, fatal accidents are rare. It is a boy's nature to see what is farther down or upstream, what is just over the hill, or on the other side of the pond. Most landowners know this, and, so long as no serious damage is done to property, little if any

---

[153] Prosser p. 365. See also Michie's Jurisprudence of Virginia and West Virginia, Vol. 13B, The Michie Company, Charlottesville, Virginia, 1978, § 16.

[154] Washabaugh v. Northern Virginia Const. Co., 187 Va. 767, 48 S.E. 2d 276 at 277 (1948).

[155] Id at 277.

[156] Id at 277.

> complaint is made about trespassing boys. It would take more than a mere warning sign, fence, or any ordinary barricade to prevent adventurous boys from fishing in a still pool, or taking a swim in a natural or artificial pond. . . . To require the proprietor . . . to erect a fence or barricade around a pond and across a private road of such a character that it would prevent adventurous youth from entering, **would impose such a burden that would unduly interfere with the lawful use of the property.**[157] (emphasis added)

In a more recent case involving a 20-month-old child who fell into a drainage canal behind the apartment where she lived with her parents, the Supreme Court of Virginia stated, "A landlord is not liable to a tenant or to members of his family, whether adult or infant, resulting from an open and obvious condition existing at the inception of the tenancy, and of which the tenant knew or had means of knowing equal to the landlord."[158] On the other hand, the Virginia court recognizes the responsibility of landlords to properly maintain common areas:

> it is the duty of the landlord, with respect to reserved common areas, to use ordinary care to keep such places in a reasonably safe condition. For failure to perform that duty, the landlord is liable for injuries to tenants and others lawfully using such places for their intended purposes.[159]

This principle would appear to be applicable to structural BMP's. In summary, it would appear that the Virginia Supreme Court takes a fairly

---

[157] Id at 278-279.

[158] John Aragona Enterprises, Inc. v. Miller, 213 Va. 298, 191 S.E. 2d 804 at 805 (1972). See also Berlin v. Wall, 122 Va. 437, 95 S.E. 398 (1918) and Langhorne Road Apartments, Inc. v. Bisson, 207 Va. 474, 150 S.E. 2d 540 (1966).

[159] Taylor v. Virginia Construction Corp., 209 Va. 76, 161 S.E. 2d 732 at 734 (1968).

conservative stance on this issue, with a tendency to side with landowners.[160]

FINANCING ON-SITE BMP'S

The allocation of construction costs in the case of on-site best management practices is simple---the landowner who owns the site requiring a BMP pays the bill. Certainly in the case of temporary on-site BMP's, this would be a cost of construction, much as any other temporary construction site cost/requirement (such as fencing, scaffolding and concrete formwork). Likewise, a required permanent on-site BMP would be considered part of the overall site development plan. Such costs are absorbed by the landowners concerned. Of course, if the landowner is a developer, these costs will eventually be passed on to prospective consumers. Thus, the argument can be made from a economic viewpoint that the cost of reducing nonpoint pollution is being appropriately internalized by those who would enjoy the benefits of the land development. Otherwise, a technological externality in the form of pollution would be absorbed by society and not by those creating it.

In the case of permanent on-site BMP's (such as detention ponds) developed on subdivision-type properties, which change from single landowner (developer) to multi-landowner status, the allocation of construction costs

---

[160] See BeVier & Brion, Judicial Review of Local Land Use Decisions in Virginia, Institute of Government, University of Virginia, Charlottesville, Va., 1981.

will still be passed on to new property owners. In such a case, an on-site BMP is, in reality, becoming an off-site BMP. The economic issue of concern in this circumstance is allocation of maintenance costs (and responsibility)---an issue to be dealt with in Chapter Three. Costs aside, maintenance of on-site BMP's remains an important area for consideration.

Maintenance of On-Site BMP's

Because on-site BMP's are located on a single-landowner's property, the responsibility for maintenance is clearly that of the owner. Assuming there are no local ordinances defining specific methods of maintenance, the choice is left up to the landowner. With temporary BMP's, maintenance is less of a concern, since the necessary manpower and equipment will usually be on the site (in the case of construction). For permanent on-site BMP's, a plan for maintenance is needed, with the costs being paid by the landowner. The simplicity of defining who is responsible for both the cost of BMP construction and maintenance of on-site BMP's would appear to make enforcement by local authorities fairly simple. Whether this is in fact the case is an issue to be addressed in the final chapter.

CHAPTER THREE: OFF-SITE BMP'S

Off-site or regional BMP's provide unique opportunities to urban planners. By definition, an off-site BMP is a facility which serves an area encompassing the properties of two or more landowners. It functions, much like its on-site counterpart, to mitigate the effects of surface runoff pollution from the entire area it serves. The definition of an off-site BMP implies that the actual process of nonpoint pollution control takes place off the site or land area from which the nonpoint pollution originates.

The ownership of the land on which an off-site BMP exists is a factor which adds an additional degree of complexity to this discussion of off-site BMP's. Essentially there are two possibilities: the local government can own the land/BMP or ownership may be private. The reason for these two options is based on how a local government chooses to finance BMP construction; either from public funds or by placing the financial burden on developers through zoning ordinances. If an off-site BMP is privately-owned, it is likely to be owned initially by a developer who is developing a large residential or industrial/commercial complex. Until such time ownership passes to the collective body of homeowners or businesses, this off-site facility is still, by definition, an on-site BMP. In either case, ownership is private. If BMP's are owned and operated by a local government, ownership is public. Public ownership may result when a locality constructs a BMP on land it has acquired (by pur-

chase or eminent domain), or when a developer (of a large tract of land, such as a subdivision) constructs a BMP and then dedicates the land to the local government. Which category a given facility falls under will affect issues of property rights, liability, and financing.

RETENTION BASINS

One common structural BMP which has proven effective in mitigating a large variety of urban pollutants is the retention basin. Therefore, it is useful to consider how retention basins function and the extent of their effectiveness. The process of sediment transport in natural and man-made waterways involves three sub-phases: initiation of particle motion, transport of particles and particle deposition. The primary objective of structural BMP's, particularly retention basins, is to control the fate of the pollutants being transported in urban runoff, primarily by means of the efficient trapping (or deposition) of sediments. Within this overall process, various pollutants may be dissolved in the water media or adsorbed to suspended sediments, allowing the following additional processes to take place: volatilization, biodegradation, hydrolysis, photolysis, oxidation and reduction. These processes all act simultaneously to further reduce the concentrations and effects of the specific pollutants involved.[161]

---

[161] Hoehn, Robert C., "Predicting the Aquatic Fate of Toxic Organic Pollutants," unpublished pamphlet, Virginia Polytechnic Institute and State University, Blacksburg, Virginia, 1985.

At the present time, the scientific data available indicates that retention basins and extended detention basins provide "very effective removal of pollutants in urban runoff."[162] One of the key reasons for this removal is the extended time periods available for the above biological and chemical processes to take place. Findings of the NURP (Nationwide Urban Runoff Program) studies show that retention basins (generally called "wet ponds") can remove up to 90% of the total suspended solids from urban runoff.[163] On the other hand, detention basins (usually called "dry ponds") "which are designed to attenuate peak runoff rates and hence only very briefly detain portions of flow . . . are indicated by NURP data to be essentially **ineffective** for reducing pollutant loads"[164] (emphasis added). Detention basins designed to accommodate extended detention periods, however, were found to be effective for the reasons discussed above.

In another recent study, by the Northern Virginia Planning District Commission (NVPDC), regional stormwater detention facilities were determined generally to be more cost effective than on-site facilities.[165] However,

---

[162] Water Planning Division,United States Environmental Protection Agency, "Results of the Nationwide Urban Runoff Program: Executive Summary," U.S. Environmental Protection Agency, Washington, D.C., December, 1983, p. 2.

[163] Id.

[164] Id.

[165] Cavacas, Alan, "Evaluation of Regional Stormwater Detention Facilities," Northern Virginia Planning District Commission, Annandale, Virginia, June, 1984, p. 3.

local hydrologic conditions and soil types may preclude their use and require the installation of other types of BMP's instead. The report stated:

> For soils in the A/B [Soil Conservation Service] hydrologic groups it is recommended that a comprehensive watershed-wide evaluation of impacts and economics be performed in the planning stages of the project, to determine whether a regional facility is beneficial under the specific hydrologic conditions.[166]

This finding further emphasizes the need for **localized** planning. No BMP, structural or nonstructural, is necessarily better or more cost-effective than all the others under all conditions.

The fact that retention basins have long been used as urban flood control devices, and that they tend to be more cost-effective over on-site facilities, makes them viable as a choice to serve the additional purpose of controlling urban runoff pollution. However, as found in the NVPDC study, planners must be careful to consider the actual effectiveness of regional ponds in light of local physical conditions and be prepared to employ other options, such as porous pavement or grassed swales, in their stead. Nevertheless, because retention ponds are likely to be the most common off-site facility employed by localities, this discussion of off-site BMP's will be made primarily with retention basins and/or extended detention basins in mind.

---

[166] Id.

LEGISLATIVE AUTHORITY

Legislative authority for on-site BMP's is found in either the Erosion and Sediment Control Law or zoning and subdivision regulations. On the other hand, authority to require the implementation of off-site BMP's falls solely within the domain of zoning and subdivision ordinances. This is the case whether the facilities are privately or publicly owned.[167] For the purposes of achieving the "conservation of natural resources"[168] and the promotion of "the health, safety or general welfare of the public,"[169] it would appear that the incorporation of off-site BMP's into local zoning and subdivision ordinances is a viable objective.

PROPERTY RIGHTS AND EMINENT DOMAIN

The discussion of Constitutional issues of property rights in Chapter One is certainly applicable to off-site BMP implementation if off-site facilities are privately owned. However, when off-site BMP's are owned and controlled by local government, such activities become governmental functions which may require the exercise of the power of eminent domain. Eminent domain is defined as "the right of the state or sovereign to take private property for public use . . . [it] is an inherent attribute of

---

[167] Va. Code Annotated § 15.1-427 et seq (1981).

[168] Id at § 15.1-490 (Supp. 1985).

[169] Id at § 15.1-489.

sovereignty . . . the individual property owner's consent to the taking is immaterial."[170]

Eminent domain is most commonly employed in the development of public utilities and roads. It can be conferred by the government on a private corporation acting as a public utility. In one court it was stated,

> When the legislature endows a public utility company with the power to take by eminent domain such property as is necessary to fulfill its corporate purposes without restriction, the determination of what is necessary to be taken lies within the discretion of the company.[171]

Whereas such a taking is within the sovereign power of a government "for the public welfare," nevertheless the Fifth Amendment of the Constitution requires that "just compensation" be made. This concept is important to this discussion because potential exists for the taking of private property by government or authorized private corporations to construct regional runoff pollution control structures. So far, however, there is no record of condemnation of private property for the purpose of constructing such regional BMP's.

LIABILITY

When off-site facilities are privately-owned, the doctrines of tort law are applicable, with no significant differences in application from on-

---

[170] Gifis p. 153.

[171] Adams v. Greenwich Water Co., 138 Conn. 205, 83 A. 2d 177 (1951).

site BMP's.[172] However, it seems likely that off-site BMP's will often fall under the responsibility of local governments. Therefore, in examining the liability issues specific to off-site structural BMP's, it is useful to consider applications of the tort theories already discussed (negligence, strict liability, trespass and nuisance), with a primary emphasis on sovereign immunity. Liability for injury will generally fall within the basic tort theories. However, the complex issue of sovereign immunity **must** be addressed first before liability can be attributed to the government or its employees.

Governmental Immunity

In one recent Virginia Supreme Court case, the court stated that the sovereign immunity issue is a very complex area, involving issues of "governmental functions vs. proprietary functions, simple negligence vs. gross negligence, and scope of the employee's duties."[173] Whereas the degree to which the actions of a government employee are deemed negligent is a determining factor in some cases, a common means of determining where

---

[172] In the case where off-site facilities are jointly-owned by several parties, apportionment of liability can become complex. Such issues are beyond the scope of this paper, however, readers desiring to pursue this area further are directed to Chapter 8, "Joint Tortfeasors," of Prosser, William L., Handbook of the Law of Torts, 4th ed., West Publishing Co., St. Paul, Minn., 1971, pp. 291-323.

[173] Hinchey v. Ogden at 893.

sovereign immunity can or cannot be employed, involves the question of whether or not the employee exceeded the scope of his/her duties:

> [T]he immunity of the State from actions for tort extends to State agents and employees where they are acting legally and within the scope of their employment, but if they exceed their authority and go beyond the sphere of their employment, or if they step around it, they do not enjoy such immunity.[174]

Probably the key determinant of applicability in cases which would involve structural BMP's, however, is whether the government actions are deemed governmental or proprietary.

Governmental actions or functions are activities "done or furnished for general public good."[175] An example of a governmental function is the operation of a fire department.[176] As enumerated by the Virginia Supreme Court, governmental functions enjoy sovereign or governmental immunity:

> A municipality is clothed with two-fold functions; one governmental, and the other private or proprietary. In the performance of a governmental function, a municipality acts as an agency of the state to enable it to better govern that portion of its people residing within its corporate limits. . . . In the exercise of governmental powers a municipal corporation is held to be exempt from liability for its failure to exercise them, and for the exercise of them in a negligent or improper manner. This immunity is based on the theory that the sovereign can not be sued without its consent, and that a designated agency of the sovereign is likewise immune.[177]

---

[174] Sayers v. Bullar, 180 Va. 222, 22 S.E. 2d 9 at 13 (1942).

[175] Gifis, p. 205.

[176] See Richmond v. Warehouse Corp., 148 Va. 60 (1927).

[177] Hoggard v. Richmond, 172 Va. 145 at 147, 200 S.E. 610 (1939).

On the other hand, proprietary functions are those which are commercial in character and which benefit the government and/or a subsector of the general public. When a government provides certain services (which, conceivably, could also be provided by a private corporation) such as water supply, sewage, public swimming pools, etc., such activities are deemed proprietary because they either generate income for the government or provide services to a select portion of the public. As stated by the Virginia Supreme Court:

> There are granted to a municipal corporation, in its corporate and proprietary character, privileges and powers to be exercised for its private advantage. In the performance of these duties the general public may derive a common benefit, but they are granted and assumed primarily for the benefit of the corporation. For an injury resulting from negligence in their exercise or performance, the municipality is liable in a civil action for damages in the same manner as an individual or private corporation.[178]

The distinction between governmental and proprietary activities is not clear. One author of tort law has stated, "the classification of particular functions has proved to be so confused and difficult, and has been the subject of so much disagreement, that little can be said about it here."[179] Nonetheless, it is clear that if an activity engaged by a municipal corporation is deemed governmental by the court, it will generally enjoy sovereign immunity; if it is considered to be proprietary, it will not.

---

[178] Id.

[179] Prosser, William L., Handbook of the Law of Torts, 4th ed., West Publishing Co., St. Paul, Minn., 1971, p. 979.

Municipal governments may also engage in "ministerial" activities. As stated by one tort law expert, ministerial functions involve "less personal judgment . . . and are done improperly at the [government's] peril."[180] Whereas typical ministerial activities include voter registration, filing of documents, care of prisoners and the collection of taxes, a ministerial function most applicable to BMP's, is maintenance.[181] In fact, the bulk of existing case law on this subject deals with this very issue of maintenance, particularly with failure to maintain public sewer systems. The municipal corporation, in providing a service to the public, would be held equally liable for damages resulting from improper maintenance, as would a private corporation which might provide the same service.

In an 1891 Virginia case, the City of Richmond was found liable for damages occurring to the basement of a private landowner caused by a defective sewer pipe. In this case, the Virginia Supreme Court stated,

> A sewer controlled by a city and so constructed that it causes water and filth to flow into a private person's cellar, is a nuisance, and if, when notified, it fails to abate it, . . . the city is liable for the damages resulting therefrom.[182]

In a similar case occurring in 1903, a stormwater drainage pipe failed due to improper maintenance, causing tremendous flooding into an adjacent

---

[180] Id at 989-990.

[181] Id at 990

[182] Chalkley v. City of Richmond, 88 Va. 402 at 408, 14 S.E. 339 (1891).

private factory. As in the previous case, it was shown that the city was negligent in its ministerial duty to properly maintain the storm drain. The court found the city liable, stating, "It is the duty of a city, from the time it acquires a sewer, to maintain it in a reasonably proper condition."[183]

It seems likely that the operation and maintenance of regional stormwater and NPS control facilities by government would be defined by the courts as being ministerial activities. In such circumstances, the cloak of sovereign immunity would offer no protection. Another important area relative to the topic of sovereign immunity is legislation which waives sovereign immunity automatically for state activities: the Virginia Tort Claims Act.

The Virginia Tort Claims Act

For federal cases, the Federal Tort Claims Act of 1946 waived sovereign immunity within the specific restrictions of the act.[184] Likewise, in 1981, the Virginia General Assembly passed the "Virginia Tort Claims Act" which states,

---

[183] City of Richmond v. Gallego Mills Co., 102 Va. 165 at 176, 45 S.E. 877 (1903).

[184] 28 U.S.C.A. § § 1346, 1402, 1504, 2110, 2401, 2402, 2411, 2412,2671-2680.

> Subject to the provisions of this article, the Commonwealth shall be liable for claims for money . . . on account of damage to or loss of property or personal injury or death caused by the negligent or wrongful act or omission of any state employee while acting within the scope of his employment.[185]

Among the restrictions imposed are a $25,000 limit of payable damages, claims accruing before July 1, 1982 do not apply and "the individual immunity of judges, the Attorney General, Commonwealth's attorneys, and other public officers . . . from tort claims for damages is hereby preserved."[186]

It is also important to note that this act is applicable only to the state government and its employees:

> nor shall any provision of this article be applicable to any county, city or town in the Commonwealth or be so construed as to remove or in any way diminish the sovereign immunity of any county, city or town in the Commonwealth.[187]

Whereas the Tort Claims Act now allows for compensation to private parties under certain restricted circumstances, nevertheless, the sovereign immunity doctrine remains an intricate aspect of tort law.

---

[185] Va. Code Annotated § 8.01-195.3 (1984).

[186] Id.

[187] Id at § 8.01-195.3 (6) (1984).

FINANCING OFF-SITE BMP'S

Financing By Government

While on-site facilities are paid for by the appropriate landowners concerned, off-site facilities often require more elaborate means of financing the construction costs. In Virginia, a variety of options are available. Drainage districts may be created within which special drainage taxes may be levied.[188] General revenues may be used to finance "the necessary expenses of the government."[189] Municipal bonds are also authorized for use by Virginia localities,[190] as is the authority to "receive and accept from any federal agency grants for or in aid of the construction of any project."[191] Likewise, "The governing body of any county, city or town may impose taxes or assessments upon the abutting property . . . for making [local improvements]."[192] Although not used very much to date, local governments may also collect from developers a "pro rata share of the cost of providing reasonable and necessary sewerage and drainage facilities, located outside the property limits of the land owned or controlled by him."[193] These financing methods are applicable

---

[188] Id at § 21-112.11 et seq (1983).

[189] Constitution of Virginia, 1971, Article X, § 8.

[190] Va. Code Annotated § 15.1-175 (b) (1981) and § 15.1-185 (1981).

[191] Id.

[192] Id at § 15.1-239 (Supp. 1985).

[193] Id at § 15.1-466 (j) (Supp. 1985).

to BMP projects constructed by local governments as part of the government's overall master plan.

Imposition of Costs on Developers

Under the title, "Land Subdivision and Development," the Virginia Code states, "Nothing herein shall be construed as creating an obligation upon any municipality or county to pay for grading or paving, or for sidewalks, sewers, curb and gutter improvements or construction."[194] The apparent intent of this language is to place the financial burden of constructing supplemental sewage and stormwater runoff facilities, created by newly-developed lands, on developers. The application to BMP's appears to be straightforward. In practice, this is where a number of Virginia localities are drawing their legislative authority.

Local governments may choose to require developers to construct regional structures in the course of development. From an economic point-of-view, this approach ultimately places the financial burden on those who would later be utilizing those developments which would be producing runoff pollution---resulting in an internalized technological externality. Another advantage to this approach (in the eyes of conservative Virginians) is that it reduces the size of government and places the economic burden

---

[194] Id at § 15.1-479 (1981).

on those private parties who will tend to have a greater motivation toward minimizing costs and achieving economic efficiency.

In fact, this approach has precedent in Virginia. For example, in Chesterfield County, the county Environmental Engineering Department makes efficient use of the county zoning and subdivision ordinances to require developers to construct regional facilities within subdivisions and on large commercial sites (such as shopping centers). Developers in Chesterfield County are required to maintain stormwater runoff at "pre-development" conditions, the result of which is usually the construction of detention/retention facilities. In such "straight zoning" cases, Chesterfield County can impose no further requirements on the developer. If, however, the developer offers to make certain concessions in exchange for requested alterations to regulatory requirements, the county may agree to alter the zoning requirements based on the concessions agreed to by the developer, a process called "proffering." A key point in this process is that the locality cannot take the initiative and establish the concessions: only the developer may do this.[195]

On the other hand, if a developer requests a complete rezoning of a tract of land, county engineers may either refuse or place additional requirements on the developers, in accordance with the limitations established by the county's zoning ordinance. Generally, these additional require-

---

[195] Interview with Richard M. McElfish, Director, Environmental Engineering Department, Chesterfield County, Virginia, (August 29, 1985).

ments would include those actions deemed necessary by county engineers to insure that the public's health and welfare is guaranteed. For example, if a requested rezoning would result in an increase in the peak runoff from the area in question, then county engineers may approve rezoning only if the developers agree to construct certain stormwater detention facilities. In this case, the county is practicing what is called "Conditional Use Plan Development." In Chesterfield County, this approach is a significant means by which the County requires developers to construct the necessary BMP's.[196] The end result is that the developers are responsible for financing and constructing the necessary measures to mitigate future sources of nonpoint source pollution.

An important point is that such approaches are dependent on the specifics of the zoning and subdivision ordinances of the locality concerned, the percentage of urbanization already complete, the physical conditions present and the level of understanding of NPS pollution by local county staffs. For example, in Chesterfield County, because county engineers are knowledgeable of the fact that certain retention and detention ponds also mitigate NPS pollution (as well as reduce peak runoff) they tend to require these types of facilities in rezoning cases.[197] As admirable as this is, the lack of specific provisions in the local zoning ordinance for reducing future NPS pollution after urbanization is complete creates a potential breakdown in the county's efforts to control NPS pollution.

---

[196] Id.

[197] Id.

In another example, Fairfax County utilized the proffer approach when Trifam Systems, Inc. requested a rezoning of land upstream of the Occoquan Advance Wastewater Treatment Plant in the fall of 1978 and found it to be successful. However, after several similar rezoning decisions, the County staff concluded that the proffer process in Fairfax County was an inappropriate means of implementing BMP's because it resulted in spotty coverage county-wide since it was applicable only to development which required rezoning. At that time, little land in Fairfax County was available for rezoning due to the amount of development that had already taken place.[198]

Clearly, alternative means of financing off-site BMP's are available. Some localities may choose to place the entire burden on the taxpayers while others may take the approach taken by Chesterfield County and employ already-existing zoning and subdivision ordinances to require developers to construct the necessary structural measures. This flexibility afforded to Virginia's local governments appears to be necessary, based on the number of variables involved (percentage of urbanization, physical conditions, local ordinance construction). Nevertheless, one fundamental weak point remains: because Virginia's nonpoint source abatement program is still primarily a voluntary one with minimal state oversight, Virginia

---

[198] Hartigan, John P., et al, "Areawide and Local Frameworks for Urban Nonpoint Pollution Management in Northern Virginia," in Proceedings of National Conference on Stormwater Management Alternatives held in Wilmington, Delaware, October 3-5, 1979, p. 24-28.

localities appear to have the "flexibility" to accomplish little in controlling urban NPS pollution.

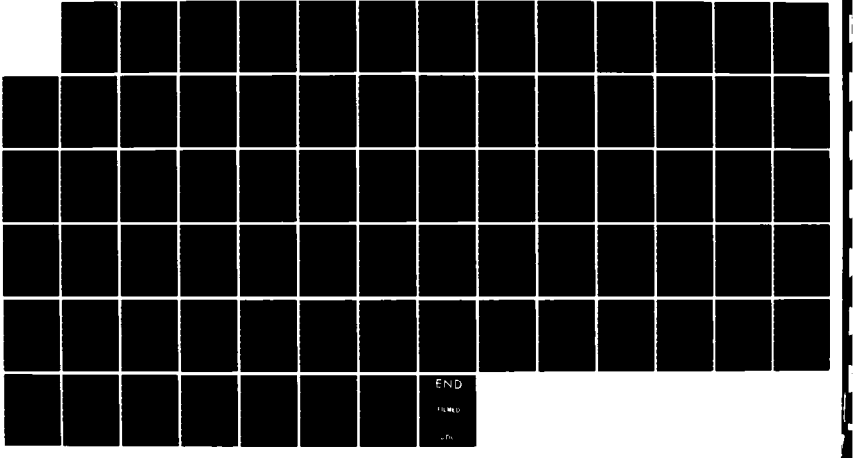
Maintenance of Off-Site Facilities

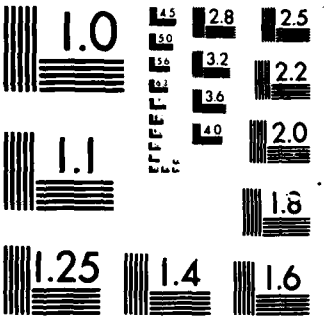
Once off-site facilities are constructed, the question of maintenance becomes an important issue of concern. In subdivisions and on commercial sites where ownership shifts from the single developer to a number of homeowners and businesses, maintenance may present a special problem. In general, responsibility will shift from the original developer to one of two entities: the local businessmen/homeowners association or the local government.

If a private group of citizens is to effectively assume responsibility for BMP maintenance, it must establish some kind of infrastructure capable of ensuring that adequate maintenance is performed. In light of other maintenance-type activities normally performed or overseen by homeowners associations, such as playground and park upkeep, it would seem probable that such an activity could be handled by the local association. A local government guarantee that such maintenance is being properly performed might include a local ordinance requiring a certain maintenance procedure, complemented by periodic inspections of such facilities by the county, city or town engineers. This would hopefully preclude such cir-

AD-A163 693 CONTROLLING NONPOINT POLLUTION IN VIRGINIA'S URBANIZING AREAS: AN INSTITUTIONAL PERSPECTIVE(U) ARMY MILITARY PERSONNEL CENTER ALEXANDRIA VA G M WELLS 20 JAN 86 2/2

UNCLASSIFIED F/G 13/2 NL





cumstances as occurred in a Pennsylvania subdivision where local landowners filled in a pond to construct a tennis court.[199]

To further avoid such an occurrence, a local government might also retain the authority to undertake remedial maintenance and bill the errant homeowners or businessmans association.[200] Such an approach would follow the manner in which the Virginia Erosion and Sediment Control Law gives local governments this authority with parties who fail to maintain erosion and sediment control plans.[201] Most important, however, would be a means of educating the responsible people about proper care and maintenance and the reasons why the BMP is present.

This type of approach is being utilized in Chesterfield County. The county Environmental Engineering Department establishes an indemnification agreement with the local homeowners organization or developer. This agreement places responsibility for maintenance and vector control on the homeowners and responsibility for the structural integrity of the BMP on the county. The county makes periodic inspections (every three years) of these private facilities, and can make spot inspections as the need arises. Chesterfield County discourages the use of dry ponds

---

[199] Yaeck, David C., "Detention Ponds: A Local Government Viewpoint," in Proceedings of the Conference on Stormwater Detention Facilities: Planning, Design, Operation and Maintenance held at New England College, Henniker, New Hampshire, August 2-6, 1982, p. 273.

[200] Yaeck at 274.

[201] Va. Code Annotated § 21-89.7 (1983).

because of their tendency to be unsightly. Wet ponds are encouraged by the county engineers for both aesthetic reasons and because they were determined by the NURP study to be more effective in mitigating NPS pollution.[202]

For various reasons, BMP maintenance by private organizations may not be feasible. In such cases, the local government becomes the responsible party. This approach also has precedent in Virginia. In Fairfax County, for example, all regional facilities are maintained by the Department of Public Works.[203] The County owns a small portable dredge which is used to dredge silt from regional retention ponds. Silt is pumped into a drying area or "decanting basin" and is later hauled away at an average cost of five to ten dollars per cubic yard.[204] Such an approach may be more cost-effective in certain areas, and it certainly provides a higher degree of certainty that maintenance will take place. Clearly, financing and maintenance arrangements will vary from locality to locality for any number of pertinent, locality-specific reasons.

---

[202] Supra Note [195].

[203] Interview with William W. Smith, Engineer, Fairfax County Department of Environmental Management, Fairfax, Virginia, (April 12, 1985).

[204] Koenig, John W., Urban Stormwater Management in Fairfax County, Virginia, Fairfax County Department of Public Works, Fairfax, Virginia, 1980, p. 2.

MANAGING FUTURE GROWTH

A concern unique to off-site BMP's is that of accommodating future growth or increased urbanization. Existing institutional means of meeting this need are within the realms of local zoning and subdivision ordinances.[205] Further, the Virginia Code encourages "local governments to . . . plan for the future development of communities"[206] and directs that "[e]very governing body in this State shall adopt a comprehensive plan for the territory under its jurisdiction."[207] Clearly, it is within the power of Virginia's local governments to incorporate into local government plans measures to mitigate future urban nonpoint source pollution. This can be done in much the same way that planning for sewage and stormwater systems is done.

To date, planning for future BMP's has yet to receive a great deal of attention in Virginia. An obvious contributing factor is the voluntary nature of Virginia's NPS Pollution Control and Abatement Program. Another reason for the lack of BMP planning is the fact that such planning would require a certain degree of localized research to most efficiently plan for the best and most cost-effective BMP's. This fact was brought out

---

[205] Yearwood, Richard M., Planning and Land Use Controls: Zoning and Subdivision Regulations in Virginia, Center for Urban and Regional Studies, Virginia Polytechnic Institute and State University, Blacksburg, Virginia, 1971, pp. 19-20.

[206] Va. Code Annotated § 15.1-427 (1981).

[207] Id at § 15.1-446.1.

previously by the NVPDC study of regional detention facilities. Fortunately, however, there is already precedent in Virginia for such localized planning.

Managing Future Growth in the Occoquan Basin

In the late 1960's, the 9.8 billion gallon Occoquan Reservoir, water supply to over 640,000 residents of the Virginia suburbs adjacent to Washington D.C., was found to be in the advanced stages of eutrophication, thus endangering this important urban water source.[208] After a one-year study, the Virginia State Water Control Board (SWCB) in 1971 responded by initiating its "Occoquan Policy," requiring the local jurisdictions to replace the eleven secondary sewage treatment plants in the Occoquan basin with a single regional advanced wastewater treatment plant (AWT). This single AWT would provide for 99.5% removal of biochemical oxygen demand (BOD), 99.5% removal of phosphorus and 97% removal of nitrogen. In July of 1978, the 82 million dollar AWT began operations.[209]

The Occoquan Policy was based on the assumption that the eutrophication problem in the reservoir was the result of both incomplete treatment of

---

[208] Hartigan, John P., et al, "Areawide and Local Frameworks for Urban Nonpoint Pollution Management in Northern Virginia," in Proceedings of National Conference on Stormwater Management Alternatives held in Wilmington, Delaware, October 3-5, 1979, p. 1-2.

[209] Id.

wastewater by the eleven secondary sewage treatment plants (STP's) and runoff from agricultural sources in the basin.[210] It was further assumed that the construction of the regional AWT would not only eliminate the levels of pollutants previously discharged by the eleven secondary STP's but also reduce agricultural runoff by encouraging the accelerated conversion of agricultural lands in the Occoquan basin to suburban/urban development.[211] Subsequent studies of nonpoint pollution in the Occoquan watershed, however, showed the reverse to be true.

During the exceptionally wet summer of 1975, for example, 90% of the phosphorus and 85% of the nitrogen entered the reservoir from nonpoint sources.[212] Furthermore, in the midst of a severe drought in 1976-1977, water quality in the reservoir actually improved, during a time when very little input came from nonpoint sources.[213] The SWCB's "Occoquan Policy" and the new AWT had effectively controlled the basin's point sources; however, nonpoint sources still loomed as a problem yet to be reckoned with.

As the designated 208 Planning Agency, the Northern Virginia Planning District Commission (NVPDC) was authorized by the Metropolitan Washington

---

[210] Metcalf and Eddy, Inc., "1969 Occoquan Reservoir Study," prepared for the Virginia State Water Control Board, Richmond, VA, 1970.

[211] Id.

[212] B. L. Weand, et al, "External Factors Affecting Water Quality in an Eutrophic Impoundment," Water Supply, 1983, pp. 94-96.

[213] Id.

Council of Governments (COG) to coordinate the development of an areawide water quality control plan for the Occoquan basin.[214] In August of 1976, NVPDC began its planning appraisals utilizing field data from studies conducted by both the Occoquan Watershed Monitoring Laboratory (OWML) and the Civil Engineering Department of Virginia Polytechnic Institute & State University (VPI&SU) to develop and calibrate the Occoquan Basin Computer Model.[215] The results of these studies (which, significantly, covered a six year period before the AWT came on line, and several years after it became operational) concluded that:

> future urban development in the absence of nonpoint pollution controls can be expected to increase, rather than decrease, the rate of Occoquan Reservoir eutrophication to levels which warrant concern, even after point source discharges of plant nutrients have been eliminated.[216]

Based on the NVPDC findings, a 208 areawide plan for the Occoquan Basin was established in November 1978, with two primary goals: (A) the implementation of the most cost-effective NPS mitigation techniques during the early stages of urbanization and (B) the management of agricultural

---

[214] Hartigan, p. 4.

[215] Hartigan, John P. et al, "Calibration of Urban Nonpoint Pollution Loading Models," Proceedings of ASCE Hydraulics Division Specialty Conference on Verification of Mathematical and Physical Models in Hydraulic Engineering, ASCE, New York, N.Y., August, 1978, pp. 363-372.

[216] Hartigan, John P. et al, "Areawide and Local Frameworks for Urban Nonpoint Pollution Management in Northern Virginia," in Proceedings of National Conference on Stormwater Management Alternatives held in Wilmington, Delaware, October 3-5, 1979, pp. 7-8.

NPS loadings.[217] Even though this program is only advisory, the key point is the fact that it is based on a significant body of **localized** data, such as "land use-nonpoint pollution" relationships and BMP effectiveness data. All of this data is available to local planners within the Occoquan Basin, providing them with the necessary information to make better decisions concerning NPS issues.

For example, Fairfax County used the NVPDC study data in the case discussed earlier, where Fairfax County used the proffer approach to encourage Trifam Systems, Inc. to implement certain NPS mitigation techniques prior to rezoning. Trifam Systems, Inc. sought to rezone 45 acres of land from R-1 (1 unit/acre) to R-8 (8 units/acre). Using the land use-NPS pollution relationships and BMP efficiency data developed in NVPDC's studies, the county staff was able to estimate the projected pollutant washoff from the Trifam site with no mitigation measures and similar washoff rates for the same site with a variety of BMP combinations.[218] Based on the fact that one of the BMP combinations with R-8 zoning would maintain NPS loadings at the level projected with R-1 zoning, the county agreed to allow the rezoning only if Trifam agreed to include the necessary BMP's. As already discussed, Trifam proffered to do this, making the inclusion of the BMP plan a binding requirement of the rezoning. Thus, the availability of a local data base helped Fairfax County

---

[217] Hartigan, p. 17.

[218] Hartigan, p. 25.

to efficiently manage and control this additional growth with minimal impact on water quality from nonpoint sources.

INTERJURISDICTIONAL AGREEMENTS

Because political boundaries rarely coincide with watershed boundaries, an issue of potential significance to the implementation of off-site BMP's is that of interjurisdictional disputes. Virginia's key local political entities are its cities, counties and towns,[219] to which authority for planning, zoning and subdivision of land has been delegated by state law.[220] Therefore, because the physical nature of the nonpoint source pollution problem is watershed-related, a clear need exists for a mechanism for resolving runoff pollution issues which cross political lines.

One such mechanism might be the establishment of Regional Service Districts as authorized under the Area Development Act of 1968. Because RSD's could be created to encompass a number of local jurisdictions (as PDC's do) they likely would cover large portions of, or entire watersheds. Therefore, it is conceivable that these "watershed commissions" might be given the authority to monitor and control pollution emanating from runoff within Virginia's watersheds. In theory, this sounds good, in practice it would face great difficulties. A national program with some similar-

---

[219] Constitution of Virginia, 1971, Article VII § 1. For a more detailed discussion, see Jennings, George W., Virginia's Government, Virginia State Chamber of Commerce, Richmond, Virginia, 1980, pp. 65-86.

[220] Va. Code Annotated § 15.1-427 et seq (1981).

ities to this idea was established by the federal government under the Water Resources Planning Act (WRPA) of 1965.[221] The WRPA provided for establishment of river basin commissions across the nation which had the duties of collecting and analyzing information, conducting planning and coordinating with the states. The concept behind these commissions was to alleviate the problems associated with interjurisdictional drainage basin issues. These commissions have almost all but disappeared due to a lack of federal funding and an apparent disinterest on the part of most states to continue their existence.

There are differing views as to the success of these river basin commissions. One apparent reason for their demise is the fact that in general, organizations which are created to accomplish one thing have a tendency to be left out of the mainstream of the political process. This thesis is supported by the fact that the Tennessee Valley Authority (TVA), an entity organized along river basin boundaries, has enjoyed great success since its inception. This is because TVA is significantly involved in local political processes due to its participation in a variety of concerns beyond water resources development. With this in mind, and the fact that Virginians are a people who tend to disfavor "more government," such organizations likely would not be successful or even created in Virginia. Additionally, local governments are often loath to give up their own authority unless forced to or "encouraged" to by the state (such as happened when the SWCB established the "Occoquan Policy" discussed in the previous

---

[221] 42 U.S.C.A. § 1962 et seq (Supp. 1985).

section). Nevertheless, the fact that enabling state legislation already exists allowing for the creation of Regional Service Districts is an important feature of the existing institutional framework.

An institutional mechanism available to mediate interjurisdictional disputes between local governments is the Commission on Local Government. However, the Commission has not been used to mediate BMP-related issues yet. Evaluation of its capabilities in this arena therefore must be largely speculative. As with the Regional Service Districts, however, the Commission does remains a potential, albeit untested, tool. Therefore, at this juncture examination of approaches Virginia's local governments have used to date appears worthwhile.

Because Virginia's nonpoint source abatement program remains a voluntary program, motivation for localities to form such joint-agreements has historically tended to focus on specific **local** problems affecting several local jurisdictions. (This fact alone should be an indicator that efforts to reduce nonpoint pollution loadings into the Chesapeake Bay must be initiated at the state and national level with uniformly enforced contributions made by all localities concerned---altruism is not necessarily a strong point of most local governments!) By far the most common motivation to local governments in Virginia has been that of salvaging local water supply reservoirs.

Interjurisdictional Cooperation in the Occoquan Basin

As discussed in the preceding section, the eutrophication of the Occoquan Reservoir forced several Virginia local governments to develop interjurisdictional agreements to prevent unacceptable degradation of their common water supply. When the Northern Virginia Planning District Commission was authorized by the Metropolitan Washington Council of Governments to coordinate the development of the areawide 208 plan, NVPDC's efforts were to be supervised by an advisory committee called the "Occoquan Study Group." This group included senior staff representatives from the six jurisdictions in the Occoquan basin as well as the City of Alexandria, a major user of Occoquan water.[222]

When the areawide program was first established in November of 1978, the decision was made that it should be administered by a multijurisdictional entity. This body, the Occoquan Policy Board, is comprised of the same representatives from the basin's jurisdictions as made up the "Occoquan Study Group."[223] In February 1982, the "Occoquan Basin Nonpoint Pollution Management Program" was formally signed by all participating jurisdictions. It is administered by the Board and has the following purpose:

> [T]he maintenance of acceptable levels of water quality within the Occoquan Basin's free flowing streams and impoundments through the

---

[222] Hartigan, John P. et al, "Areawide and Local Frameworks for Urban Nonpoint Pollution Management in Northern Virginia," in Proceedings of National Conference on Stormwater Management Alternatives held in Wilmington, Delaware, October 3-5, 1979, pp. 2-4.

[223] Id.

> management of nonpoint pollution loadings. In order to achieve this purpose, the participating political subdivisions located within the Occoquan Basin will develop and maintain local nonpoint pollution management programs by voluntary application of "best management practices" (BMP's) and the submission of necessary documentation on all drainage modification projects, BMP's, and new development as agreed by participants . . . All determinations by and recommendations of the Policy Board described herein are advisory only, and are not binding on any political subdivision or agency participating in the program.[224]

To support the Occoquan Policy Board, the "Occoquan Basin Technical Advisory Committee" was formed. Staffed by representatives from the participating political subdivisions, water/sewer authorities, sanitary authorities, soil and water conservation districts, and various technical advisors throughout the state, the Committee is responsible to

> conduct or oversee the technical investigators required to maintain an effective nonpoint pollution management planning program and to make recommendations and comments on all significant matters considered by the Board at its semi-annual meetings.[225]

NVPDC is responsible for providing the necessary staff support to the Board and Committee. In addition, "Fifty percent of the annual Program budget shall be contributed by the participating jurisdictions . . . and the remaining fifty percent shall be contributed by the Basin's two major water supply/distribution agencies."[226] Further, the "Executive Director of NVPDC shall serve as chief administrative agent of the Board, and in

---

[224] Northern Virginia Planning District Commission, "Program Statement of Occoquan River Basin Nonpoint Pollution Management Program," Annandale, Virginia, February 5, 1982.

[225] Id.

[226] Id.

this capacity, shall be responsible to the Board for managing its staff support and the administration of agreements and contracts."[227]

A strength of the Program is provided by the technical assistance of the Technical Advisory Committee. Although this point was brought out earlier, it cannot be overemphasized as being important. Because nonpoint pollution is directly related to local conditions, local research is important. Also, the Occoquan experience points clearly to the fact that mechanisms for interjurisdictional cooperation are important. Even though the Occoquan Policy Board's recommendations are "advisory only" and "not binding," at least the interjurisdictional mechanism is in place.

The experience of the Occoquan Basin also exemplifies the utility of PDC's in providing technical, staff and coordinating support to local jurisdictions. NVPDC has been extensively used to assist in both research and coordination in the Occoquan Basin. Clearly, the experience of Northern Virginia provides the entire state with a model to follow for abating NPS pollution in an urbanizing, interjurisdictional situation.

---

[227] Id

CHAPTER FOUR: NONSTRUCTURAL BMP'S

> BMP's are either structural or management practices that can be used to reduce conditions which degrade the quality of the ground or surface waters. The intent of BMP's is to decrease the generation of pollutants from nonpoint sources rather than to simply treat what is generated.[228]

To this point, the focus of this paper has been on structural best management practices either located on an individual landowner's property or located in a centralized location for the purpose of serving a larger area containing the properties of several landowners. On-site BMP's may be temporary or permanent in nature and will normally be the responsibility of the owner of the property served. Off-site BMP's will usually be permanent and will often (but not necessarily) be the responsibility of the local government. Nonstructural BMP's on the other hand, are best management practices that are truly **management practices** as opposed to structural solutions to nonpoint source pollution. The Virginia State Water Control Board definition of BMP's above makes the delineation between structural measures and "management practices" clearly, yet clarifies that the purpose of both is the same.

---

[228] Virginia State Water Control Board, Best Management Practices Handbook--Management (SWCB Planning Publication 322), Richmond, Virginia: State Water Control Board, 1981.

COMMON NONSTRUCTURAL BMP'S

Just as detention basins tend to be one of the most common off-site structural BMP's, certain nonstructural BMP's, such as street sweeping, solid waste collection and disposal, control of foreign compounds and land use measures are common-place and deserve consideration. Because these measures are nonstructural, many of the topics already discussed have little or no application. Allocation of construction costs and maintenance arrangements are certainly of no concern, since there are no structures to be built or maintained. [Certain other costs, such as education mechanisms (classes, pamphlets) generally fall under the accepted responsibility of government.] With no physical structures involved, liability issues are very unlikely to become a major concern.

Street Sweeping

The most common nonstructural BMP employed in recent times is street cleaning. Its original purpose was not necessarily to reduce nonpoint water pollution. "The primary objective of municipal street cleaning practices has been to enhance the aesthetic appearance of streets by periodically removing accumulated litter, debris, dust, and dirt."[229]

---

[229] Virginia Soil and Water Conservation Commission, Urban Best Management Practices Handbook (State Water control Board Planning Bulletin 321), Virginia State Water Control Board, Richmond, Virginia, 1979, p. III-1.

Street sweeping is also often used as a means of reducing nonpoint loadings in surface runoff. However, the NURP studies found that "Street sweeping is generally ineffective as a technique for improving the quality of urban runoff."[239]

Solid Waste Collection and Disposal

Another nonstructural BMP already in use is the collection and disposal of solid waste. Municipal trash collection involves the efficient collection and disposal of solid waste to preclude pollution of not only water, but land and air as well. To reduce the disposal of grass/leaf litter and other solid wastes by the general public (such as on vacant lots), localities may pass ordinances making such dumping illegal and/or provide convenient public solid waste dumping sites. Fairfax County has done this by providing a public access dump which has no service charge and is open all week and on weekends.

Control of Foreign Compounds

Other measures include the control of the use and application of such potential pollutants as fertilizers, pesticides, and deicing compounds for roads and walkways. In the case of pesticides, typical measures in-

---

[239] Water Planning Division, United States Environmental Protection Agency, "Results of the Nationwide Urban Runoff Program: Executive Summary," U.S. Environmental Protection Agency, Washington, D.C., December, 1983, p. 15.

clude their direct regulation by controlling both sales and methods of application, such as occurs under the Federal Environmental Pesticide Control Act.[231] On the other end of the spectrum from direct regulation is the education of the general public. As an example, Fairfax County in 1980, published, "You and Your Land, A Homeowner's Guide for Fairfax County," which is a very handy guide giving advise to county homeowners on various methods (such as fertilizer and pesticide application techniques) for protecting land and water, while also saving both energy and money. The State Water Control Board provided funds for this project and modified the manual for statewide application.[232]

These measures are, by the State Water Control Board's definition, "source controls;" i.e., they focus on stopping diffuse pollutants at their source, before pollution actually takes place.[233] While not all source controls are nonstructural BMP's, nonstructural BMP's generally tend to be source controls. By systematically controlling solid wastes, a certain measure of pollutants will be prevented from entering potential receiving waters. Likewise, by controlling the types, quantities and methods of

---

[231] 7 U.S.C.A. § 136 et seq (Supp. 1985).

[232] Virginia State Water Control Board, "You and Your Land," (State Water Control Board Information Bulletin 551), Virginia State Water Control Board, Richmond, Virginia, October, 1982.

[233] Virginia Soil and Water Conservation Commission, Urban Best Management Practices Handbook (State Water Control Board Planning Bulletin 321), Virginia State Water Control Board, Richmond, Virginia, 1979, p. II-1.

application of pesticides/fertilizers/deicing compounds, such potential pollutants can, to a large degree, be greatly reduced.

Localities desiring to implement any of the wide variety of nonstructural Best Management Practices on a voluntary level, already have a number of valuable resources available to them. The State Water Control Board's Urban Best Management Practices Handbook provides extensive information on a variety of nonstructural BMP's. To educate local citizens, the SWCB's pamphlet, "You and Your Land," is a useful resource. Another nonstructural measure which is essentially a means of controlling NPS pollutants at their source is specialized land use.

Land-Use Measures

Traditional, or Euclidean zoning has primarily been concerned with the separation of land uses, to avoid such obvious discontinuities as the location of industries next to housing areas. In 1926, when the Euclid and Goreib decisions were made, such thinking was progressive. The "Roaring Twenties" were a time of tremendous industrial expansion as well as an enthusiastic public focus on "the good life."[234] The idea of zoning land for specific uses came into being before this social backdrop. The concepts behind zoning have evolved to meet the needs of an ever-changing

---

[234] Stillman, Edmund, The American Heritage History of the 20's and 30's, American Heritage Publishing Company, Inc., New York, 1970.

society. Certainly one of the greatest forces involved in this evolution in recent years has been the increased public understanding and focus on the need for good stewardship of the nation's environmental resources.

Partially as a result of this changing public awareness, new techniques in zoning and land subdivision have developed. One such method, which has been suggested as a viable means of controlling nonpoint pollution, is cluster development. Through the use of cul-de-sacs and loop streets, lots can be clustered together and surrounded by open space.[235] Such techniques not only provide for more open space common areas, but can also make for more attractive developments. Important to planners concerned about runoff pollution, more open space integrated throughout urban areas will provide areas for the infiltration of runoff and therefore greatly help to mitigate the pollution therein.

Two other techniques are density zoning and planned unit development (PUD). Density zoning is similar to cluster development. The concept involves the predetermination of the total number of units a given tract of land can sustain, leaving the choice of lot sizes up to the developer. This approach not only gives developers greater flexibility but will also most often result in a cluster-type development, with the same advantages discussed above.[236]

---

[235] The Citizen's Guide to Zoning by Herbert H. Smith, American Planning Association, Chicago, Illinois, 1983, pp. 180-182.

[236] Id.

Planned unit development is basically one step beyond the concept of density zoning and cluster development. It was originally envisioned as a means of developing master-plans for large areas of land and has since evolved into a tool for the planning of small, self-contained communities.[237] Two such examples outside the Washington, D.C. area are the communities of Columbia, Maryland and Reston, Virginia. Clearly, the advantages to planners "starting fresh" with an unspoiled tract of land are almost limitless. Planners concerned with integrating open areas into such communities to control runoff and runoff pollutants have a distinct advantage in using PUD.

Finally, another idea gaining prominence in planning circles is the concept of "carrying capacity."[238] A term borrowed from the science of ecology, carrying capacity in a natural ecosystem is defined as "the maximum population that a given environment can support indefinitely."[239] This concept is directly translatable to planning of areas of land for human use. By establishing the carrying capacity of a given area of land, based on resource availability and local conditions, planners could control development to ensure that a usable environment is sustained for future generations.

---

[237] Smith pp. 183-185.

[238] Fredland, Daniel R., "Environmental Performance Zoning: An Emerging Trend?," in The Urban Lawyer, Vol. 12, No. 4, Fall 1980, p. 681.

[239] Keeton, William T., Elements of Biological Science, W. W. Norton & Company, Inc., New York, 2d ed., 1973, p. 553.

LEGISLATIVE AUTHORITY FOR NONSTRUCTURAL BMP'S

To implement regulatory nonstructural measures, the sources of legislative authority, if they exist, are as diverse as the methods available. Since at least two of the measures discussed above are generally governmental functions (deicing of highways and street sweeping), control can become an "in-house" function with no need for additional legislative authority. Under the Federal Environmental Pesticide Control Act, a number of pesticides are already regulated by the federal government. Likewise, a parallel law, the Virginia Pesticide Law,[240] exists in Virginia. Control is primarily at the state level under this statute, however, other legislative means for local governments to control pesticides exist. Because "[e]very city and town may . . . prevent injury or annoyance from anything dangerous, offensive or unhealthy,"[241] and "[a]ny county may adopt such measures as it may deem expedient to secure and promote the health, safety and general welfare of the inhabitants of such county,"[242] localities in Virginia appear to have the necessary legislative authority to enact ordinances to prevent the pollution of public waters.

With regard to land use measures, Virginia has enacted legislation which authorizes local governments to establish zoning ordinances which take

---

[240] Va. Code Annotated § 3.1-189 et seq (Supp. 1985).

[241] Id at § 15.1-14 (5) (1981).

[242] Id at § 15.1-510 (1981).

into consideration the "conservation of natural resources"[243] and promote "the health, safety or general welfare of the public."[244] The **Declaration of Legislative Intent** for the chapter of the Virginia Code entitled "Planning, Subdivision of Land and Zoning," states:

> This chapter is intended to encourage local governments to improve public health, safety, convenience and welfare of its citizens and to plan for the future development of communities to the end that transportation systems be carefully planned; that new community centers be developed with adequate highway, utility, health, educational, and recreational facilities; that the needs of agriculture, industry and business be recognized in future growth; that residential areas be provided with healthy surrounding for family life; that agricultural and forestal land be preserved; and that the growth of the community be consonant with the efficient and economical use of public funds.[245]

Such language appears to provide the authority to localities wishing to take the initiative and adopt progressive, environmentally-oriented zoning and subdivision ordinances.

MANAGING FUTURE GROWTH

The management and accommodation of future urbanization is a major area of concern to local planners concerned with the long-term control of NPS pollution. Because local governments are encouraged by the Virginia Code to "plan for the future development of communities,"[246] there is no need

---

[243] Id at § 15.1-490 (Supp. 1985).

[244] Id at § 15.1-489 (Supp. 1985).

[245] Id at § 15.1-427 (1981).

[246] Id at § 15.1-427 (1981).

to question whether legislative authority exists. Because so few local governments in Virginia are actively incorporating NPS pollution considerations into their long-range planning, it is useful to consider an example of what has been done in this regard in one area of Virginia: Northern Virginia.

Managing Future Growth in Fairfax County

In January 1980, a study was initiated by the Fairfax County Board of Supervisors to evaluate land-use planning and water quality in the County's sector of the Occoquan watershed. The County's Office of Comprehensive Planning developed a model to predict how various land-use patterns and BMP's would affect water quality. The study concluded that further degradation of water quality could not be precluded using any combination of BMP's if development were to proceed according to the existing zoning plan.[247] The result of this study was a decision by the Board of Supervisors to downzone the Fairfax County portion of the Occoquan watershed from five dwellings per acre to one dwelling per acre.[248]

---

[247] Fairfax County Office of Comprehensive Planning, Occoquan Basin Study, Fairfax County, Virginia, March, 1982.

[248] Fairfax County, Virginia, Board of Supervisors, Zoning Ordinance RZ-82-W-054 (July 28, 1982).

As might be expected, this decision was challenged by developers in court. The court ruled that Fairfax County **did** have the authority to include concerns for water quality in zoning decisions and that the county's concern that future development would degrade water quality in the Occoquan Reservoir was a **valid** reason for more restrictive zoning.[249] Nonetheless, even though the County's ordinance was upheld, the court ruled that because the County's decision to rezone was "piecemeal" and not comprehensive, and because the rights of the developers bringing suit had vested before the rezoning action, the plaintiffs were allowed to proceed with some of the planned development.[250] (Only those developments that had already been approved by the County were allowed to proceed.) Nine months later, this same court approved an agreement between the County and developers which essentially eliminated further appeals of the county's zoning limitations.[251]

This decision is only of precedental value to Fairfax County since it was not appealed to the Virginia Supreme Court. If it is ever brought before the high court, it might well be reversed, given the fact that the Supreme

---

[249] Aldre Properties, Inc. v. Bd. of Supervisors of Fairfax County, Chancery No. 78425, slip op. at 2 (19th Judicial Circuit of Virginia, 1985).

[250] Id.

[251] Washington Post, p. C7, September 18, 1985 and telephone interview with Bruce Douglas, Chief, Environmental Assessment Branch, Office of Comprehensive Planning, Fairfax County, Virginia, December 31, 1985.

Court displays a clear propensity to side with developers.[252] Also, because this case cost the county 1.5 million dollars in legal fees and court costs,[253] it is doubtful that very many other localities in Virginia could afford to pursue a similar course of action.

Nonetheless, the need to plan effectively for future growth in Fairfax County was made clear by the findings of the Occoquan Basin Study. As discussed in the preceding chapter, this planning was based on localized (and costly) research. In fact, one might rightly conclude that in the Fairfax County case the planning process was not entirely successful since some development (4% of the disputed area[254]) was allowed to continue. This raises an obvious concern for other areas of the state. If Fairfax County, a locality clearly in the vanguard of municipalities aggressively pursuing the urban nonpoint pollution problem is having problems solving its own NPS problems, then how successful will other local governments be whose resources are much smaller than Fairfax County's? This appears to be an area where the state could provide valuable assistance to localities in the form of technical advice and/or monetary aid.

---

[252] See BeVier & Brion, Judicial Review of Local Land Use Decisions in Virginia, Institute of Government, University of Virginia, Charlottesville, Virginia, 1981.

[253] Washington Post, p. A1, January 10, 1985 and Interview Supra Note 251.

[254] Washington Post, p. C7, September 18, 1985.

INTERJURISDICTIONAL AGREEMENTS

As with structural BMP's, a need for a mechanism for interjurisdictional mediation exists. In Virginia's case, the law does not automatically provide such a mechanism. Approaches available to localities are the same as those already discussed in Chapters One and Three (Regional Service Districts, Commission on Local Government) and need not be discussed further. However, an example of what is actually being done in Virginia under the present system provides useful insights. Again, this example involves the protection of a local water supply which serves several jurisdictions.

Interjurisdictional Cooperation in the South Rivanna Basin

Albemarle County and the City of Charlottesville constitute another area in Virginia where jurisdictions have collaborated to solve a nonpoint pollution problem in an urbanizing environment. This example provides insight into the political processes often involved, as well as an understanding of nonstructural arrangements made between localities in Virginia to mitigate urban runoff pollution. The prime motivation to work together has been the threat to the area's water supply, the South Rivanna Reservoir, a water supply reservoir constructed on the South Fork of the Rivanna River. As was the case with the Occoquan Reservoir, the State Water Control Board "forced the issue" between these two jurisdictions to initiate cooperation.

In 1969, both the County and the City requested state funds for the expansion of their independent water treatment and supply facilities. The SWCB refused to allocate funds to either jurisdiction until a joint agency was formed to administer the reservoir basin.[255] In response, the County and City jointly authorized a consultant to study the issue, and in June of 1972, based on the consultant's report, adopted a joint resolution forming the Rivanna Water and Sewer Authority (RWSA). RWSA was formed "for the purpose of acquiring, financing, constructing and maintaining facilities for developing a supply of potable water for the County and the City and for abatement of pollution . . . in the Upper Rivanna River Basin." On June 7, 1973, RWSA was officially created when Albemarle County, the City of Charlottesville, the Albemarle County Service Authority and representatives of the new RWSA signed a joint agreement.[256]

Shortly after the RWSA began operations in July of 1973, it appointed a four person advisory committee to study the reservoir's pollution problems.[257] Nonetheless, despite the apparent efforts of the County and City to work together, funding for a two-year study called for by this committee became a major source of contention. In fact, the situation may not have developed further if it had not been for increased development pressure in the South Rivanna watershed.

---

[255] Norris, William K., "South Rivanna Reservoir: A Brief History and an Unsolved Problem," Presentation to Charlottesville City Council, Charlottesville, Virginia, September 15, 1980.

[256] Id.

[257] Id.

Spurred by rising public concern over water quality (and the fact all six Board seats were to be decided in the November 1975 election[258]), the Albemarle County Board of Supervisors began to take more "serious" action. As it turned out, their only significant act in support of RWSA activities was an amendment to the county erosion and sediment control ordinance restricting development on slopes in excess of 15% in the reservoir's watershed. Also, under increasing public pressure, the two year study requested by RWSA was finally initiated, relying on increased water rates to fund its execution by a consulting firm, Betz Environmental Engineers.[259]

After the County Board elections, four incumbent members were ousted, resulting in a Board which was more favorable of increased protection of the reservoir.[260] The change in orientation of the Board was significant, since after this point, progress was made at a much faster rate. Because RWSA was (and is) a **joint** administrative body between the two jurisdictions, its actions were clearly influenced by the political orientations of either local government.

---

[258] Markert, Ken, "Albemarle County/Charlottesville Watershed Management Program," unpublished paper written at Virginia Polytechnic Institute & State University, December 5, 1983, p. 6.

[259] Norris, "South Rivanna Reservoir: A Brief History and an Unsolved Problem."

[260] Id.

The first indication that the new Albemarle County Board of Supervisors was supportive of RWSA and measures to protect the reservoir occurred in January of 1976, when it enacted an ordinance prohibiting any construction within 25 square miles of land surrounding the reservoir water treatment plant. In April, 1976, the County and City jointly purchased 80 acres of land on the Ivy Creek subwatershed of the reservoir, creating a public park with the emphasis on passive recreation.[261] A year later, the two year study of the reservoir's pollution problems was completed by Betz Environmental Engineers, with the following findings:

1. The reservoir was eutrophic, phosphorus being the limiting nutrient.

2. The current rate of sedimentation was causing the reservoir to lose 8 million gallons of storage capacity per year.

3. The enactment of a runoff control ordinance was recommended.

4. A frozen foods processing plant discharging into the Rivanna River should decrease discharges by 95 to 98%.[262]

---

[261] Id.

[262] "Intergovernmental Cooperation for Watershed Protection: Charlottesville/Albemarle County, Va.," in Protecting Drinking Water Supplies Through Watershed Management, Center for Urban Studies, University of North Carolina at Chapel Hill, North Carolina, August, 1981, pp. 297-336.

Because the reservoir was surrounded by county land, it was essentially up to Albemarle County to take action on the findings of the RWSA study. In response, the Board undertook several actions. First, a county Runoff Control Ordinance was enacted, as discussed in Chapter Two. In addition, the County's Comprehensive Plan was revised, "placing stronger emphasis on the protection of the South Rivanna Reservoir."[263] The frozen foods processing plant contracted with the Albemarle Service Authority to discharge all their wastewater into a interceptor pipe and in March of 1978, the Board appointed a Watershed Management Plan Committee to review the various land-use activities in the basin (agriculture, forestry, highways and development).

The Committee was to determine the resulting impacts on water quality in the reservoir and recommend a land management program. They completed their plan in August of 1979, recommending the creation of the position of Watershed Management Official to oversee the management of all the activities in the basin.[264] Now an official position, financed equally by the County and City, this person is responsible for "coordinating, integrating, and reviewing watershed management activities."[265] Whereas RWSA was created to acquire, finance, construct and maintain joint water

---

[263] Norris, "South Rivanna Reservoir: A Brief History and an Unsolved Problem."

[264] Id.

[265] Job Description of Watershed Management Official, provided by William K. Norris, Watershed Management Official for the Albemarle/Charlottesville Office of Watershed Management, Charlottesville, Virginia.

supply facilities (in addition to protecting water quality), the Watershed Management Official is an overall manager and planner of all activities which impact on the watershed.

Subsequent actions have included the complete rezoning by Albemarle County of all county, city, state and federal property in the Rivanna watershed to conservation zoning. In addition, the Ivy Creek Natural Area was expanded through the purchase of an additional 81.5 acres of land in August of 1980, creating a greater degree of watershed protection.[266] This purchase was funded 50% from the Virginia Commission of Outdoor Recreation, a 31.54% gift from the original owner and 9.23% each from the County and City.

Examining the history of the protection efforts of the South Rivanna Reservoir indicates several important issues relative to interjurisdictional NPS pollution control programs. First, a large number of nonstructural measures were employed. Second, as was the case with the Occoquan Reservoir, a state agency, the SWCB, stepped in and essentially forced the localities to work together before state funds would be released. Third, the RWSA's efforts to study the reservoir's pollution problems and take remedial actions might have been completely stifled had not the public, through the electoral process, changed the nature of the County Board.

---

[266] Norris, "South Rivanna Reservoir: A Brief History and an Unsolved Problem."

An important point here is that **county** voters, because of concerns over **county** water quality, forced the needed changes. What if county water had not been affected and the county population had not forced changes on the Board? The RWSA study and the various actions taken by the County Board since then may not have taken place. This possibility points to a potential weak point in the state voluntary NPS program---the need for state authority to intervene in interjurisdictional disputes to insure that the best interests of the public in general are realized. Because local governments tend to have only local interests, they will be motivated to solve only local problems. NPS pollution, as exemplified in the Occoquan and South Rivanna basins, is not always a purely local problem.

CHAPTER FIVE: ISSUES FACING THE COMMONWEALTH

The purpose of this paper was to evaluate the effectiveness of Virginia's institutional framework in the implementation and enforcement of nonpoint source pollution control measures (BMP's) in the state's urbanizing areas. The institutional environment has been evaluated in terms of the federal, state and local roles, constitutional property rights issues, liability issues and the potential impact of interest groups. Three specific categories of BMP's have been examined in light of this institutional environment: on-site BMP's, off-site BMP's and nonstructural BMP's. From the local perspective, various subcategories of the institutional environment have been found to be most important: issues of financing and maintenance, managing future growth, and mechanisms for interjurisdictional cooperation. Where specific state mechanisms do not exist or have not been used (such as for interjurisdictional cooperation and managing future growth), case studies of what several Virginia localities have actually done have been examined.

Liability and property rights issues have also been addressed. Clearly, the actions of government or private parties in the realm of NPS control cannot cause public or private injury without justice being meted out through the law of torts. Likewise, all citizens of Virginia enjoy certain rights with regard to the protection of their personal property. The taking of personal property cannot occur without just compensation. Nevertheless, the reason this paper included an evaluation of liability

and property-rights issues was to provide an understanding of how the courts, particularly the Virginia Supreme Court, views these issues in relation to the potential implementation of BMP's. No further conclusions will be drawn concerning liability and property rights protection. However, it is appropriate to complete the analysis of the existing state programs and recommend a future direction for Virginia's NPS control efforts in urbanizing areas.

The control of NPS pollution in the state's urbanizing areas falls under two distinctly separate programs: the regulatory Erosion and Sediment Control Program and the voluntary Urban NPS Pollution Control and Abatement Program. Both programs have been discussed throughout this paper; they will be analyzed separately. The most important product of such an analysis will be a delineation of the key issues facing the Commonwealth concerning the control of NPS pollution in Virginia's urbanizing areas.

THE STATE EROSION AND SEDIMENT CONTROL PROGRAM---AN EVALUATION

Surveys of local governments in Virginia taken in recent years indicate that a distinct tendency **not** to support the local erosion and sediment control ordinances required by the state law exists in at least several of Virginia's localities.[267] In some cases, this tendency could well be

---

[267] Joint Legislative Audit and Review Commission, Program Evaluation Water Resource Management in Virginia, Virginia General Assembly, Richmond, Virginia, p. 91 (1976) [hereinafter, J.L.A.R.C.].

due to inadequate technical expertise within the locality. In fact, the Report of the Chesapeake Bay Commission to the Virginia General Assembly, 1985 found this to be the case in its June 1984 survey, particularly in more rural areas of the state.[268] Certainly in other cases, the paucity of local ordinance support is directly related to a pure **unwillingness** to support erosion and sediment control ordinances. These facts lead to questions about how well the state statute is being enforced at both the local and state level.

Local Enforcement of the Erosion and Sediment Control Law

The surveys of local governments taken in 1976[269] and 1984[270] indicate that capability to enforce local erosion and sediment control ordinances is lacking in many localities. In 1984, 43% of the localities responding to the survey stated that enforcement of local ordinances is insufficient

---

[268] Chesapeake Bay Commission, Report of the Chesapeake Bay Commission to the Virginia General Assembly, 1985, House Document No 28, p. 21 (1985) [hereinafter, Bay Comm. Report]. In 1984, the Virginia General Assembly enacted House Resolution 137 which recognized that nonpoint sources of pollution contribute significantly toward the deterioration of water quality within the state and the Chesapeake Bay. The resolution further requested the Chesapeake Bay Commission to make an assessment of the adequacy of staff resources at the state and local levels in implementing local erosion and sediment control programs. The Bay Comm. Report constituted the Commission's response to this request.

[269] J.L.A.R.C., p. 91.

[270] Bay Comm. Report p. 25.

due to a lack of manpower.[271] In addition, both surveys found that very few local program administrators and inspectors were properly trained in erosion and sediment control.[272] Even as late at the 1984 survey, it was shown that 80% of the state's soil and water conservation districts which responded were of the opinion that the localities within the district did not have the technical expertise to administer properly erosion and sediment control programs.[273] In both 1976 and 1984, the surveys showed that in nearly all localities, only one or two inspectors made on-site inspections and that these same inspectors essentially did erosion/sediment control inspections as an additional duty (less than two hours per week) to their normal duties.[274]

From the perspective of the Division of Soil and Water Conservation, this apparent lack of manpower complained of by localities is largely an unwillingness to allocate funds.[275] A number of the localities complained that if they enforce their own ordinances, less development will take place within their jurisdictions.[276] In 1975, a Virginia county supervisor made the comment, "This (enforcement of the Erosion & Sediment Control Law) could drive all of the building and progress in (the) county

---

[271] Id at 24.

[272] J.L.A.R.C. p. 97 and Bay Comm. Report p. 22.

[273] Bay Comm. Report p. 25.

[274] J.L.A.R.C. p. 97 and Bay Comm. Report p. 22.

[275] J.L.A.R.C. p. 97.

[276] Id.

out forever."[277] Because the Act authorizes local plan approving authorities to charge permit fees to offset the cost of the program (subject to limitations), the claim of a lack of manpower might not be valid; rather the ostensible truth lies closer to the probability that localities are concerned about discouraging development.

Many localities responding to the 1984 survey complained of limited enforcement options available to them. In fact, this claim appears to have merit. The apparent lack of willingness on the part of local government officials to enforce their own erosion control ordinances is probably acerbated by the fact that the Act does not give local governments authority for "stop work" orders. This is a powerful tool, since the stoppage of a construction project represents monetary loss to a contractor. If local governments had this authority, Division of Soil and Water Conservation staff believe that local ordinances would tend to receive significantly greater support.[278]

In addition, local magistrates appear to have a tendency to penalize violators of local ordinances lightly.[279] The experience of Chesterfield

---

[277] "Erosion Control in the County," Roanoke Times, April 25, 1975, p. 6.

[278] Telephone interview with Gerard Seeley, Jr., Director, Technical Services Section, Division of Soil and Water Conservation, Richmond, Virginia (August 12, 1985).

[279] Telephone interview with Richard M. McElfish, Director, Environmental Engineering Department, Chesterfield County, Virginia, (August 13, 1985).

County provides an example. Here the Commonwealth Attorney's Office is a willing supporter of the County Environmental Engineer's Office in prosecuting violators of the county's erosion and sediment control ordinance.[280] However, a review of five recent rulings of the local district court clearly shows a tendency on the part of the magistrates **not** to punish offenders significantly. In a 1979 case, a developer flagrantly violated the ordinance by making little attempt to install or maintain sediment controls. The magistrate "punished" the violator with a $10.00 fine.[281] In another similar case, tried in August, 1984, the magistrate fined a violator $50.00 for making no attempt to install erosion and sediment control devices.[282] In the other three cases (one in 1981, the other two in 1984), the charges were simply dropped although the violations appear to have been significant.[283]

The Chesterfield District Court is but one example of the fact that the Virginia judiciary has a propensity to favor private enterprise over governmental control. An in-depth study done in 1981 came to this conclusion.[284] A probable reason for judicial leniency in the case of the

---

[280] Id.

[281] Chesterfield County District Court, docket number 79-1186.

[282] Chesterfield County District Court, docket number 84-2727.

[283] Chesterfield County District Court, docket numbers 81-2197, 84-2926 and 84-2825.

[284] See BeVier & Brion, Judicial Review of Local Land Use Decisions in Virginia, Institute of Government, University of Virginia, Charlottesville, Virginia, 1981. This was a joint study made by the

Erosion and Sediment Control Law is that the law defines violations as being criminal offenses (misdemeanors).[285] Perhaps if violations were punishable as civil offenses, judges would be more willing to hold violators guilty.[286] Such an amendment to the law was proposed in the 1984 Session of the General Assembly as Senate Bill 409 but failed to pass.

State Oversight of the Erosion and Sediment Control Law

When compared to other states along the eastern seaboard, Virginia is the only state which has a mandatory erosion and sediment control program at the state and local levels without a procedure for review and evaluation of local permit decisions at the state level.[287] For example, in Delaware the state Division of Soil and Water Conservation is required to evaluate the local erosion/sediment control programs every three years.[288] Furthermore, a number of other eastern states have mechanisms for state-level enforcement of erosion and sediment control laws to ensure that localities are effectively implementing local programs.

University of Virginia School of Law and the Washington & Lee University School of Law.

[285] Va. Code Annotated § 21-89.11 (1983).

[286] Interview, Supra Note [278].

[287] Bay Comm. Report p. 20.

[288] Id at 17.

In 1984, the Maryland legislature granted the state Department of Natural Resources authority as the primary enforcement agency for the state Sediment Control Program. The department can only delegate this authority to localities if they demonstrate an equal or superior enforcement ability. Of course, this added responsibility requires added manpower; therefore in 1984, the state authorized $500,000 and 24 additional personnel positions within the Department to implement this enforcement duty.[289]

North Carolina maintains responsibility for statewide implementation of its Sediment Pollution Control Act and has only delegated this authority to 35 of 100 counties. In those cases where localities administer the program, the state conducts an annual review and evaluation (more frequently if problems persist). An indicator that this is more than a "rubber stamp" examination is evidenced by the fact that two local governments have had their delegated authority revoked.[290]

The Georgia erosion and sediment control law is similar to Virginia's. However, the state Department of Natural Resources, upon the request of a local Soil and Water Conservation District and the state Soil and Water Conservation Committee, can revoke a local ordinance. The Department of Natural Resources has requested authority to revoke without the involvement of the state and local Soil and Water Conservation authorities.

---

[289] Id at pp. 17-18.

[290] Id at 18.

Furthermore, other enabling legislation in Georgia, the Metropolitan Streams Protection Act, grants the Department of Natural Resources total authority to revoke local program approval authorities within Georgia's metropolitan areas. To date, eight of 14 local governments have been warned that their programs are insufficient, causing six of these localities to comply with the Department's requirements.[291]

In Virginia, however, the Erosion and Sediment Control Law does not give the state Division of Soil and Water Conservation authority to review local permit decisions to insure their proper implementation. Furthermore, the Division of Soil and Water Conservation is severely short of personnel necessary to make periodic review of local ordinances. The Division can request that the State Attorney General "take appropriate legal action" to enforce the provisions of the act, but such action would obviously require the personnel necessary at the state level to discern where violations are occurring.[292] (It is doubtful that localities will voluntarily inform the Division of "in-house" violations.) Therefore, the state at present could do little to require a locality to enforce its own ordinance. Referring to Maryland's recent grant of authority to its Department of Natural Resources, implementing a review function would clearly require additional manpower.

---

[291] Id at pp. 18-19.

[292] Va. Code Annotated § 21-89.11 (c) (1983).

Within the Division of Soil and Water Conservation, a Technical Services section consists of one clerical person and five Water Control Engineers (one of which is actually an employee of the U.S.D.A., Soil Conservation Service "on loan" to the Division).[293] Two of these engineers focus their efforts on urban water quality concerns, while the other two engineers are more concerned with agricultural water quality efforts. The Technical Services section had begun to review the effectiveness of the state and local programs, but was forced to delay the effort when it was given, in 1984, the additional responsibility for overseeing Virginia's Agricultural Pollution Control Plan for the Chesapeake Bay and Chowan River basins.[294] Essentially, then, the section's manpower resources to oversee the state Erosion and Sediment Control Program were cut in half with these added responsibilities. In essence, the state of Virginia has moved in the opposite direction in providing the resources necessary to review and enforce local program implementation.

The Bay Commission Report recommended the addition of one F.T.E. (full time equivalent) position to the Division of Soil and Water Conservation to provide the necessary staff resources to "thoroughly review the staff resources and training needed" by both the state staff and local jurisdictions. To allow the Soil and Water Conservation Commission to "administratively establish an ongoing process for reviewing local program compliance with the state Erosion and Sediment Control Law," the Bay

---

[293] Interview, Supra Note[278] .

[294] Bay Comm. Report p. 6.

Commission Report also recommended the addition of two F.T.E.'s to the state staff.[295] Both of these recommendations were introduced to the Finance Committee of the General Assembly during the 1985 Session by Senator Joe Gartland (Fairfax County) and both were defeated there.[296]

Whereas other surrounding states have the means to enforce the adequate implementation of local erosion/sediment control ordinances, Virginia has no such authority. This evaluation indicates that the weakest point in the overall state program is the state's ability to make the local programs work. Initial steps toward a more successful state program might be taken if the state staff had the additional personnel, as discussed above, to review local programs and possibly turn violators over to the Attorney General's Office. However, the potential for addition of such staff in the future seems unlikely.[297] At this point, the state legislature appears to be unwilling to adopt the Bay Commission Report recommendations. Obviously, nonpoint pollution has yet to become a priority in the eyes of a number of Virginia's legislators.

Because Virginia has such limited authority to enforce the state program, one might surmise that the state legislature views construction site runoff as being purely a local problem. Certainly, localities in Virginia have used the authority of state law to solve local problems generally

---

[295] Id at pp. 27-28.

[296] Interview, Supra Note [278].

[297] Interview, Supra Note [278].

water supply protection problems, such as the Occoquan Reservoir in Northern Virginia and the South Rivanna Reservoir in Albemarle County. Nevertheless, the erosion and sediment control program in Virginia needs to be seen as more than a local program. Fortunately, Virginia already has legislative precedent for such a program: the Virginia Wetlands Act.[298] The provisions of this unique piece of legislation provide a useful contrast.

The Virginia Wetlands Act: A Case Study in State Oversight

In the mid 1960's, the Virginia Institute of Marine Science (VIMS) conducted research on the habitat value of the coastal vegetated wetlands of Virginia. As a result of this research, the General Assembly concluded that protection of coastal wetlands was necessary and in 1968 broadened the authority of the Commission of Fisheries to include wetlands protection. In line with this new mission, the General Assembly renamed the Commission the Virginia Marine Resources Commission (VMRC). In 1972, the Wetlands Act became law to provide a mechanism for the protection of coastal wetlands.[299]

The primary regulatory mechanism in the Wetlands Act is the requirement that "[a]ny person who desires to use or develop any wetland . . . shall

---

[298] Va. Code Annotated § 62.1-13.1 et seq (Supp. 1985).

[299] Interview with Norman E. Larsen, Chief, Habitat Management, Virginia Marine Resources Commission, Newport News, Virginia, (September 13, 1985).

first file an application for a permit."[300] This application must be made through the local wetlands board or the VMRC, depending on which body has original jurisdiction. Of the 46 localities in the Tidewater area of Virginia, 30 have accepted the Act's option to adopt their own wetlands boards rather than defer original jurisdiction to the VMRC.[301] The local wetlands board, made up of "five or seven residents of the county, city or town appointed by the governing body of the county, city or town,"[302] is a mechanism distinct from the Erosion and Sediment Control Law. It can be argued that a such a board may be of value in the review of erosion and sediment control plans since wetlands boards are made up of private citizens as well as members of such governmental bodies as local planning and zoning commissions.[303] In this way, a citizen participation function is performed.

Nonetheless, the major strength of the overall program, in the opinion of VMRC staff, lies in the ability of the state to review local board of decisions through VMRC.[304] The act provides that

> The Commission shall review a decision of a wetlands board made under a wetlands zoning ordinance when . . . (1) an appeal is taken from such decision by the applicant for a permit . . . (2) The Commissioner [of VMRC] requests such a review . . . (3) Twenty-five or more freeholders of property within the [locality] in which the

---

[300] Va. Code Annotated § 62.1-13.5 § 4 (a) (Supp. 1985).

[301] Interview, Supra Note [299].

[302] Va. Code Annotated § 62.1-13.6 A (Supp. 1985).

[303] Interview, Supra Note [299].

[304] Id.

proposed project is located sign and submit a petition to the Commission[305]

This authority of VMRC to review local decisions is a significant aspect of the Wetlands Act which the Erosion and Sediment Control Law does not incorporate. In addition, it appears that this authority does not necessarily create a significant amount of work for VMRC staff.

VMRC has four staff positions for overseeing the program, covering 5,000 miles of coastline and 215,000 acres of vegetated wetlands. This staff size is viewed as adequate by VMRC.[306] It should be noted that wetlands management is only a small portion of the staff's responsibility. Management of all submerged lands in Virginia and the protection of coastal primary sand dunes, under the state Coastal Primary Sand Dune Protection Act,[307] also are the responsibility of this four-person staff. Clearly, the level of activity occurring under the Erosion and Sediment Control Law exceeds that occurring under the Wetlands Act. Nonetheless, it is valuable to note that the presence of a state oversight mechanism within the Wetlands Act appears to force localities to "do it right the first time."

For example, in the first twelve years of the Wetlands Act, of 3454 applications processed by local boards, only 132 were actually denied. One

---

[305] Va. Code Annotated § 62.1-13.11 (1982).

[306] Interview, Supra Note[299] .

[307] Va. Code Annotated § 62.1-13.21 et seq (Supp. 1985)

reason surmised by VMRC staff for this low number of denials is the fact that local boards tend to work out potential problems with applicants prior to application, to avoid requests for appeal to VMRC.[308] In addition, VMRC staff, along with VIMS personnel, attend 90% to 95% of all local board meetings.[309] The presence of VMRC and VIMS staff provides local boards with immediate assistance when needed.[310] Also, since VMRC reviews all local board decisions, staff presence at local board meetings makes review more efficient.[311]

During this same twelve-year period, of the 132 local board denials, 43 appeals were made to VMRC (33%), of which 22 (51%) were overturned by the Commission. [Of these 43 VMRC decisions, twelve (28%) were appealed to circuit courts, with six VMRC decisions being overturned (50%) at that level.[312]] Out of these 43 appeals, only three were requested by the Commission.[313] As stated above, VMRC staff believe that this low number of required Commission appeals is due to the fact that the overt presence

---

[308] Interview, Supra Note [299].

[309] Telephone interview with H. Clayton Bernick, Environmental Engineer, Habitat Management, Virginia Marine Resources Commission, Newport News, Virginia (January 17, 1986).

[310] Id.

[311] Id.

[312] Interview, Supra Note [299].

[313] Interview, Supra Note [309].

of VMRC and its authority to review local decisions has tended to force local governments to "do it right the first time."[314]

Another strong aspect of the administration of the Wetlands Act is the close relationship maintained between VMRC and VIMS. VIMS provides one-day training courses for local inspectors and often accompanies both local and VMRC inspectors on inspection trips of construction sites in wetlands areas.[315] Of course, the scientific orientation of VIMS makes it a valuable source of information and technical support to VMRC. Clearly, this asset adds more "punch" to the authority of VMRC. As discussed previously, the lack of solid scientific data is a major deficiency in efforts to control nonpoint pollution. Looking to the VIMS/VMRC example, it would appear that such a liaison could be established between the Division of Soil and Water Conservation and such organizations as the Soil Conservation Service, the Virginia Polytechnic Institute & State University Extension Service[316] or the State Water Control Board, to more effectively enforce the Erosion and Sediment Control Law.

---

[314] Id.

[315] Id.

[316] In discussion with Dr. Walden R. Kerns, Associate Professor, Department of Agricultural Economics, Virginia Polytechnic Institute and State University, the use of the VPI & SU Extension Service as a technical advisory body has definite potential. To simply assign this function as an additional task for state extension agents, however, would not be a viable solution, in light of their already-full list of duties. In the opinion of Dr. Kerns, the hiring of "regional extension agents," whose job would be to specifically advise local governments and the Division of Soil and Water Conservation on urban BMP issues, has greater potential for success. (Telephone interview on November 14, 1985).

The Wetlands Act provides a good example of an existing statutory program in Virginia that utilizes a state oversight mechanism to ensure the proper employment of local programs. In this case, the mechanism is necessary because a "failure" at the local level would result in a "failure" at the regional and state level. A critical wetlands habitat damaged or destroyed in one jurisdiction could have a severe impact on the life cycle and/or population density of certain animal or plant species throughout the wetlands areas of Virginia. Such destruction of critical habitats can have not only devastating ecological and aesthetic impacts but economic impacts as well, particularly if the affected species is an important cash crop of local fisherman (such as fish or shellfish).

An analogous situation appears to exist in the control of NPS pollution. The impacts of pollution from nonpoint sources are diffused. Pollution stemming from runoff in Virginia's urbanizing areas tends not to necessarily affect the urban areas themselves, but rivers, lakes and estuaries some distance away. At such time it is shown that a direct relationship exists between land-use and water quality, the VMRC administration of the Wetlands Act may provide a useful example for the establishment of a state regulatory NPS program.

THE URBAN NPS POLLUTION CONTROL AND ABATEMENT PROGRAM---AN EVALUATION

A significant weak point in the state Urban NPS Pollution Control and Abatement Program is the fact that for the most part, for urbanizing

areas, the program is essentially limited to the administration of the Erosion and Sediment Control Law and the educational activities of the Division. Although the SWCB encourages localities to take advantage of the "much greater flexibility involved in dealing with the problem when the time and opportunity are available to plan for and incorporate BMP's and other measures into new development,"[317] mere encouragements do not ensure a viable program. It would seem more logical to delegate to the Division of Soil and Water Conservation the additional responsibility of administering a state program for mitigating long-term urban NPS pollution in addition to its administration of the state Erosion and Sediment Control Program. This would consolidate in a single state agency the responsibility for the Urban Program in developing areas. More important, it would spell out a specific state program for the incorporation of BMP's to control long-term NPS pollution in urbanizing areas.

Because the Urban Program is completely voluntary, unlike the Erosion and Sediment Control Program, there is almost no data or information available with which to gauge its success. One indicator, however, is the number of localities which have agreed to implement programs. In order to encourage local governments to support the voluntary NPS abatement program, the Executive Director of the SWCB has contacted each local government leader (town and city mayors, administrators, county supervisors, etc.)

---

[317] Management Handbook, p. IV-5.

and asked each local government to support by resolution the voluntary implementation of BMP's throughout their jurisdictions.[318]

Since 1980, of 224 local governmental jurisdictions in Virginia, only 44 have responded---20 counties, 8 cities, and 16 towns. Of these, 21 localities agreed to "direct" the locality's chief executive officer to employ BMP's "whenever practical." An additional 17 local governments adopted resolutions "authorizing" the chief executive officer to insure BMP's are used when practical; four localities adopted resolutions "encouraging local citizens to use BMP's;" and two local jurisdictions simply endorsed the state plan by resolution.[319] The fact that over 80% of Virginia's local governments have not responded in over five years, signaling **any** level of adherence to a voluntary program, would indicate that the overall state program is receiving little support.

These figures also seem to suggest that a regulatory program might well be the only way to ensure successful control of NPS pollution statewide. The evaluation of the Erosion and Sediment Control Law in the preceding section further supports the notion that only with state oversight is any NPS abatement program going to be successful. Nevertheless, the SWCB remains committed to a voluntary program until such time it is convinced that there is a "demonstrated cause and effect relationship between land

---

[318] SWCB Information Bulletin 562, p. 11.

[319] Id.

use activities, nonpoint source pollution, and water quality."[320] Therefore, it seems unlikely that the mere lack of statewide support for the present program alone would result in the initiation of a regulatory program.

One good reason for going to a regulatory program is the fact that it would provide a mechanism for interjurisdictional mediation. The case studies concerning the Occoquan and South Rivanna watersheds both pointed to the fact that it was the SWCB which initiated the interjurisdictional cooperation between the parties involved. In the case of the South Rivanna Reservoir, the SWCB threatened to withhold state funds until Charlottesville and Albemarle County agreed to cooperate. More important in this particular case was the fact that **only** because county residents were also affected by the degraded water supply does it appear that the County Board of Supervisors became more receptive to initiating the necessary measures to protect the reservoir from nonpoint sources. Clearly, the potential exists for jurisdictions in Virginia to be affected by nonpoint sources of pollution from other localities that have no motivation to control them. If Virginia had a regulatory program to mitigate NPS pollution in the state's urbanizing areas, a mechanism to mediate between local governments would automatically be established.

At the opposite end of the spectrum of a voluntary program is an overall state policy regarding land use. Although it is unlikely that Virginia

---

[320] Management Handbook, p. I-2.

would adopt such a policy in the near future, it is useful to consider how such a policy would affect the issue of controlling NPS pollution. An example of a state which does have a specific state policy on land use, with a primary objective of protecting the environment, is Vermont.

Land Use Policy in Vermont

In 1970, Vermont passed its "Act 250."[321] Act 250 established seven District Commissions and a state Environmental Board to carry out the new state land development policy, which is based on performance oriented criteria.[322] The District Commissions issue permits to parties involved in development activities (over certain threshold criteria) if these activities meet the following standards:

1. Will not result in undue water or air pollution.

2. Does have sufficient water available for the reasonably foreseeable needs of the subdivision or development.

---

[321] 10 Vt. Statutes Annotated § § 6001 et seq (1984).

[322] By definition, a performance standard or criterion is "A minimum requirement or maximum allowable limit on the effects or characteristic of a use, usually written in the form of regulatory language . . . Performance standards in zoning might describe allowable uses with respect to smoke, odor, noise, heat, vibration, glare, traffic generation, visual impact, and so on, instead of the more traditional classifications of 'light' or 'heavy' lists of uses." In Smith, The Citizen's Guide to Zoning, p. 227.

3. Will not cause an unreasonable burden on an existing water supply, if one is to be utilized.

4. Will not cause unreasonable soil erosion or reduction in the capacity of the land to hold water so that a dangerous or unhealthy condition may result.

5. Will not cause unreasonable congestion or unsafe conditions with respect to use of the highways, waterways, railways, airports and airways, and other means of transportation existing or proposed.

6. Will not cause an unreasonable burden on the ability of the municipality to provide educational services.

7. Will not place an unreasonable burden on the ability of the local governments to provide municipal or governmental services.

8. Will not have an undue adverse effect on the scenic or natural beauty of the area, aesthetics, historic sites or rare and irreplaceable natural areas.

9. Is in conformance with a duly adopted capability and development plan, and land use plan when adopted.

10. Is in conformance with any duly adopted local or regional plan under chapter 117 of Title 24.[323]

Obviously, the Vermont statute goes beyond a simple statement of policy. It forces all local development to adhere to the overall state development policy. Because these permits are in addition to those required at the local level, the Vermont system adds another layer to the overall land use planning process. The act has been generally appraised as having measurably improved the quality of Vermont's environment while not greatly reducing the quantity of development.[324] Whether Virginians are ready to accept this degree of state control need not be debated. Nonetheless, the Vermont approach provides an interesting contrast to the Virginia approach.

CONCLUSIONS

An issue which has surfaced throughout this paper is the question of whether there is a need for greater state control in Virginia's NPS abatement programs. The Erosion and Sediment Control Program, already a regulatory program, is hampered by a lack of adequate state oversight. Further, based on the analysis of the present voluntary NPS program for urbanizing areas, it seems clear that a certain amount of state oversight

---

[323] 10 Vt. Statutes Annotated § 6086 (a) (1984).

[324] Fredland p. 689.

is necessary to ensure compliance. Although the state Erosion and Sediment Control Program could be improved with fairly minor amendments to the Law and with increased staff resources allotted to the Division of Soil and Water Conservation, whether the time has arrived to initiate a regulatory NPS program remains a debatable question. In the eyes of the SWCB, the pivotal issue is the clear determination of a cause-effect relationship between land use, NPS pollution and water quality. Although it was not the purpose of this paper to analyze related data, nevertheless, a growing body of data supports this cause-effect relationship.

At such time state authorities become convinced that land use relates directly to water quality and a need for a regulatory program has arrived, one universal truth would seem to apply to the drafting and amending of legislation: the need for specific language to address the specific problems.[325] To adopt an overall state regulatory urban NPS program, new legislation likely would need to be passed. Although, as indicated in Chapter One, the State Water Control Law seems to provide all the authority needed to promulgate a regulatory program, specific legislation would be safer. The study by BeVier and Brion, "Local Land Use Decisions in Virginia," indicated that the Virginia courts have a strong tendency

---

[325] Cox, William E., "Legislation: What Is? What Ought to Be? The Role of State Law in Improving Land-Use Management Within the Virginia Portion of the Chesapeake Bay Watershed," Proceedings of a conference entitled, Land Use and the Chesapeake Bay held at Fort Monroe, Virginia, May 1984 (Virginia Cooperative Extension Service Publication 305-003).

to protect the rights of developers from governmental restriction.[326] With legislation written very specifically, emphasizing water quality protection, perhaps this trend would be reversed.[327]

The drafting of either a statewide regulatory urban NPS program or land-use policy are not necessarily the recommendations of this paper. In light of the obvious deficiencies with the voluntary approach so far, it seems likely that a regulatory approach will eventually be needed. However, Virginia is a state of marked conservatism, an important factor in the timing of such changes. Nevertheless, certain changes to both the Erosion and Sediment Control Law and the voluntary program should (and from a political point-of-view, probably could) be made soon. A summary of recommended short-term changes are as follows:

1. The Erosion and Sediment Control Law

   - Amend legislation to provide local governments with a "stop work" order.

   - Amend legislation to change the present criminal penalty (misdemeanor) to a civil penalty so that local magistrates will

---

[326] BeVier & Brion, Judicial Review of Local Land Use Decisions in Virginia, Institute of Government, University of Virginia, Charlottesville, Virginia, 1981.

[327] Cox, p. 11.

not be inhibited from assessing penalties, and therefore find more parties guilty where violations occur.

- Amend legislation to give the Division of Soil and Water Conservation the necessary authority to review local permit decisions and overturn those decisions not deemed in consonance with proper control of erosion and sedimentation.

- Amend legislation to give the Division of Soil and Water Conservation the authority to assume control of a local program if, upon review, that program is deemed insufficient.

- Provide the Division of Soil and Water Conservation the necessary personnel and fiscal resources not only to accomplish the additional responsibilities recommended above but also to make periodic review of local programs.

2. The Urban NPS Pollution Control and Abatement Program (SWCB)

- Expand the Urban Program in urbanizing areas to include the implementation of post-construction NPS measures, so that the Program in urbanizing areas goes beyond erosion and sediment control. (If this portion of the Urban Program would remain under the responsibility of the Division of Soil and Water Conservation, additional resources would be necessary for the Division to carry out this task.)

not be inhibited from assessing penalties, and therefore find more parties guilty where violations occur.

- Amend legislation to give the Division of Soil and Water Conservation the necessary authority to review local permit decisions and overturn those decisions not deemed in consonance with proper control of erosion and sedimentation.

- Amend legislation to give the Division of Soil and Water Conservation the authority to assume control of a local program if, upon review, that program is deemed insufficient.

- Provide the Division of Soil and Water Conservation the necessary personnel and fiscal resources not only to accomplish the additional responsibilities recommended above but also to make periodic review of local programs.

2. The Urban NPS Pollution Control and Abatement Program (SWCB)

- Expand the Urban Program in urbanizing areas to include the implementation of post-construction NPS measures, so that the Program in urbanizing areas goes beyond erosion and sediment control. (If this portion of the Urban Program would remain under the responsibility of the Division of Soil and Water Conservation, additional resources would be necessary for the Division to carry out this task.)

- Establish interjurisdictional mechanisms, similar to the Occoquan Policy Board, in all 22 Planning District Commissions.

- Establish a similar state-level interjurisdictional mechanism for the overall Urban NPS Program. It would address "inter-Planning District Commission" NPS issues and would be administered by SWCB, with representatives from the above PDC-level interjurisdictional mechanisms.

As leaders in a democratic society, Virginia's leaders have the responsibility to honor the wishes of their constituents. Nonetheless, leadership also carries with it the implicit responsibility to educate and guide when necessary. With regard to controlling NPS pollution in Virginia's urbanizing areas, such guidance is needed now, and those state leaders who have both the insight and courage to initiate such changes will be men and women remembered for making a significant contribution to the Commonwealth.

APPENDIX A. VOLUNTARY URBAN PROGRAM DOCUMENTS

VIRGINIA URBAN WATER QUALITY MANAGEMENT PLAN
IMPLEMENTATION AGREEMENT

The _____ hereby agrees with the State Water Control Board to implement the Virginia Urban Water Quality Management Plan within its boundaries, where its boundaries are within the State Planning Area. The Plan is designed to reduce nonpoint source pollution from urban areas and to the extent feasible make the waters fishable and swimmable.

The _____ will:

(1) Promote the use of Pollution Source Control and Collection and Treatment Best Management Practices (BMPs) in conjunction with the operation and maintenance of public facilities.

(2) Promote the use of Pollution Source Control BMPs by citizens through public education programs.

(3) Participate with the Soil and Water Conservation Commission in the evaluation and improvement of its sediment and erosion control program.

(4) Participate in training seminars held by the Commission relating to erosion and sediment control.

(5) Promote the control of runoff quality and quantity to predevelopment levels for developing areas as promoted by the Commission.

(6) Report annually (August 1) to the State Water Control Board the progress in attaining the program goals of the plan. The report will include the urban BMPs used, the extent of use of the BMPs, the implementation mechanisms used, resources committed, and other pertinent information. The report will be submitted on a form prepared by the State Water Control Board (Attachment 1).

(7) The State Water Control Board will summarize the information provided by the _____ and include the summary in the annual progress report to EPA on statewide progress in nonpoint source pollution control.

This agreement may be terminated by either party provided the withdrawing party gives at least 180 days notice to the other party of its intentions to terminate. This Agreement may be amended in writing by mutual consent.

REPORTING FORM

1. Implementation Mechanisms for Urban BMP's:

   Complete the form showing which BMP's are used in your locality and what mechanism or technique is utilized to implement each BMP.

BEST MANAGEMENT PRACTICES	IMPLEMENTATION MECHANISMS	---Municipal Operations	---Street Tree Programs	---Zoning Ordinances	---Subdivision Regulations	---Special Ordinances*	---Erosion and Sediment Control Ordinances	---Stormwater Management Regulations	---Building Codes and Inspection Programs	---Incentive and Disincentive Programs*	---Extension Service Advisory Programs	---Public Educations Programs*	---Capital Improvements	---Other*
2.01 Street Cleaning														
2.02 Refuse Collection and Leaf Disposal														
2.03 Vegetative Control														
2.04 Fertilizer Application Control														
2.05 Pesticide Use Control														
2.06 Reduction of Traffic-Generated Pollutants														
2.07 Highway Deicing Chemical Control														
2.08 NPS Pollution Control on Construction Sites														
3.01 Urban Impoundments														
3.02 Parking Lot Storage														
3.03 Rooftop Detention														
3.04 Rooftop Runoff Disposal														
3.05 Cistern Storage														
3.06 Infiltration Pits and Trenches														
3.07 Concrete Grid and Modular Pavement														
3.08 Porous Asphalt Pavement														
3.09 Grassed Waterways, Filter Strips and Seepage Areas														
4.01 Sewer System Control														
4.02 Conveyance System Storage														
4.03 Conventional Flow Regulators														
4.04 Fluidic Flow Regulators														
4.05 Treatment														

* Specify the type of program utilized

II. Extent of Use of BMPs

BMPs	Extent of Use (Include frequency of use, area of coverage and method of implementation of program as applicable)
2.01 Street Cleaning	
2.02 Refuse Collection and Leaf Disposal	
2.03 Vegetative Control	
2.04 Fertilizer Application Control	
2.05 Pesticide Use Control	
2.06 Reduction of Traffic-Generated Pollutants	
2.07 Highway Deicing Chemical Compounds	
2.08 NPS Pollution Control on Construction Sites	
3.01 Urban Impoundments	
3.02 Parking Lot Storage	
3.03 Rooftop Detention	
3.04 Rooftop Runoff Disposal	
3.05 Cistern Storage	
3.06 Infiltration Pits and Trenches	
3.07 Concrete Grid and Modular Pavement	
3.08 Porous Asphalt Pavement	
3.09 Grassed Waterways, Filter Strips, and Seepage Areas	
4.01 Sewer System Control	
4.02 Conveyance Flow Regulators	
4.03 Conventional Flow Regulators	
4.04 Fluidic Flow Regulators	
4.05 Treatment	

III. Estimate total of administrative and operational costs incurred in implementing the BMPs.

IV. Estimate the costs incurred by developers in complying with regulations on BMPs (including erosion and sediment controls).

V. Estimate additional funds needed by local government to accelerate urban BMP program. Include a description of the additional work to be accomplished with the extra funds.

VI. Describe any public information and education programs conducted and report the number of people contacted.

VII. Describe any other unique programs conducted that reduce non-point source pollution which do not relate specifically to the implementation of BMPs.

BIBLIOGRAPHY

1. Adams v. Greenwich Water Co., 138 Conn. 205, 83 A. 2d 177 (1951).

2. Agins v. City of Tiburon, 447 U.S. 255 (1980).

3. Albemarle County Code, Albemarle County, Virginia, § 19.1-4 et seq (1977).

4. Aldre Properties, Inc. v. Bd. of Supervisors of Fairfax County, Chancery No 78425, slip op. at 2 (19th Judicial Circuit of Virginia, 1985).

5. American Law Institute. Restatement of the Law, Second, Torts, 7 Vols. St Paul, Minnesota: American Law Institute Publishers, 1979.

6. American Jurisprudence, 2d, 82 Vols. Rochester, N.Y. and San Francisco, California: Lawyers Cooperative Publishing Co. and Bancroft-Whitney Co., 1980.

7. American Law Reports Annotated Second Series. Rochester, N.Y. and San Francisco, California: Lawyers Cooperative Publishing Co. and Bancroft-Whitney Co., 1979.

8. American Law Reports Annotated Third Series. Rochester, N.Y. and San Francisco, California: Lawyers Cooperative Publishing Co. and Bancroft-Whitney Co., 1979.

9. American Public Works Association Research Foundation. Urban Stormwater Management: Special Report No. 49 Chicago, Illinois: American Public Works Association, 1982.

10. Association of State and Interstate Water Pollution Control Administrators. "ASIWPCA Nonpoint Source Assessment Project." Information flier provided by Robbi J. Savage, Executive Director, ASIWPCA.

11. Association of State and Interstate Water Pollution Control Administrators. "What is ASIWPCA?" Information pamphlet produced by the Association of State and Interstate Water Pollution Control Administrators. Washington, D.C., 1984.

12. Berlin v. Wall, 122 Va. 437, 95 S.E. 398 (1918).

13. Bernick, H. Clayton. Environmental Engineer, Habitat Management, Virginia Marine Resources Commission, Newport News, Virginia, telephone interview, January 17, 1986.

14. BeVier, Lillian R. and Brion, Denis J. Judicial Review of Local Land Use Decisions in Virginia. Charlottesville, Virginia: Institute of Government, University of Virginia, 1981.

15. Byrum v. Orange County, 217 Va. 37, 225 S.E. 2d 369 (1976).

16. Caton, Bernard. Director, Office of Policy Analysis, Virginia State Water Control Board, Richmond, Virginia, telephone interview, November 14, 1985.

17. Cavacas, Alan. "Evaluation of Regional Stormwater Detention Facilities." Annandale, Virginia: Northern Virginia Planning District Commission, June, 1984.

18. Chalkley v. City of Richmond, 88 Va. 402, 14 S.E. 339 (1891).

19. Chesapeake Bay Commission. Report of the Chesapeake Bay Commission to the Virginia General Assembly, 1985 (House Document 28). Annapolis, Maryland: Chesapeake Bay Commission, January, 1985.

20. Chesterfield County District Court, Chesterfield County, Virginia. Docket Numbers 79-1186, 84-2727, 81-2197, 84-2926, 84-2825.

21. City of Manassas v. Rosson, 224 Va. 12, 294 S.E. 2d 799 (1982).

22. City of Richmond v. Gallego Mills Co., 102 Va. 165, 45 S.E. 877 (1903).

23. 40 Code of Federal Regulations § 130.11, 122.26, 130.6, 130.8,

24. Cohens v. Virginia, 19 U.S. 257 (1821).

25. Constitution of Virginia. (1971).

26. Cox, William E. "Legislation: What Is? What Ought to Be? The Role of State Law in Improving Land-Use Management Within the Virginia Portion of the Chesapeake Bay Watershed." Land Use and the Chesapeake Bay: Proceedings of a Conference, May 1984. (Virginia Cooperative Extension Service Publication 305-003.) Blacksburg, Virginia: Virginia Cooperative Extension Service, December, 1985.

27. Cox, William E. "Waste Application to Land: The Land-Use Issue." Journal of Water Resources Planning and Management, Vol 110, No. 3 (July 1984), 270-284.

28. Department of Environmental Programs, Metropolitan Washington Council of Governments. "Urban runoff in the Washington Metropolitan Area: Final Report, Washington D.C. Area Urban Runoff Project." Washington D.C.: Metropolitan Washington Council of Governments, December, 1983.

29. Douglas, Bruce. Chief, Environmental Assessment Branch, Office of Comprehensive Planning, Fairfax County, Virginia, telephone interview, December 31, 1985.

30. Dye v. Burdick, 553 S.W. 2d 833 (1977, Ark).

31. Fairfax County Office of Comprehensive Planning. Occoquan Basin Study. Fairfax, Virginia: Fairfax County Office of Comprehensive Planning, March, 1982.

32. Fairfax County Board of Supervisors. Zoning Ordinance RZ-82-W-054, July 28, 1982.

33. The Federal Register, September 26, 1984, March 7, 1985 and August 12, 1985.

34. Findley and Farber. Environmental Law. St. Paul, Minnesota: West Publishing Co., 1981.

35. Fisher, Paul E. Project Director, Hampton Roads Water Quality Agency, Norfolk, Virginia, interview, September 16, 1985.

36. Fredland, Daniel R. "Environmental Performance Zoning: An Emerging Trend?" The Urban Lawyer, Vol. 12, No 4 (Fall 1980), pp. 678- 699.

37. Gillelan, Mary E. et al. Chesapeake Bay: A Framework For Action. Annapolis, Maryland: Chesapeake Bay Program of the United States Environmental Protection Agency, December, 1983.

38. Gifis, Steven H. Barron's Law Dictionary. Woodbury, New York: Barron's Educational Series, 1984.

39. Goreib v. Fox, 145 Va. 554, 134 S.E. 914 (1926).

40. Hartigan, John P. et al. "Areawide and Local Frameworks for Urban Nonpoint Pollution Management in Northern Virginia." Proceedings of National Conference on Stormwater Management Alternatives. Wilmington, Delaware, October 3-5, 1979, p. 1-32.

41. Hartigan, John P. et al. "Calibration of Urban Nonpoint Pollution Loading Models." Proceedings of ASCE Hydraulics Division Specialty Conference on Verification of Mathematical and Physical Models in Hydraulic Engineering, ASCE. New York, N.Y., August, 1978, 363-372.

42. Hinchey v. Ogden, 226 Va. 234, 307 S.E. 2d 891 (1983).

43. Hoehn, Robert C. "Predicting the Aquatic Fate of Toxic Organic Pollutants." Unpublished pamphlet, Virginia Polytechnic Institute and State University, Blacksburg, Virginia, 1985.

44. Hoggard v. Richmond, 172 Va. 145, 200 S.E. 610 (1939).

45. Jennings, George W. Virginia's Government. Richmond, Virginia: Virginia State Chamber of Commerce, 1980.

46. Joint Legislative Audit and Review Commission of the Virginia General Assembly. Program Evaluation Water Resource Management in Virginia. Richmond, Virginia: Joint Legislative Audit and Review Commission, September 15, 1976.

47. John Aragona Enterprises, Inc. v. Miller, 213 Va. 298, 191 S.E. 2d 805 (1972).

48. Keeton, William T. Elements of Biological Science. New York: W.W. Norton & company, Inc., 2d ed., 1973.

49. Kerns, Waldon R. Associate Professor, Water Resources Economist, Department of Agricultural Economics, Virginia Polytechnic Institute and State University, Blacksburg, Virginia, telephone interview, November 14, 1985.

50. Koenig, John W. Urban Stormwater Management in Fairfax County, Virginia. Fairfax, Virginia: Fairfax County Department of Public Works, 1980.

51. Lager John A. et al (Metcalf & Eddy). Urban Stormwater Management and Technology: Update and User's Guide, prepared for the Municipal Environmental Research Laboratory, Office of Research and Development, U.S. Environmental Protection Agency. Cincinnati, Ohio, September, 1977.

52. Langhorne Road Apartments, Inc. v. Bisson, 207 Va. 474, 150 S.E. 2d 540 (1966).

53. Larsen, Norman E. Chief, Habitat Management, Virginia Marine Resources Commission, Newport News, Virginia, interview, September 13, 1985.

54. Latimer, James. "Godwin's 30 Years: A Cycle of Change?" The Richmond Times Dispatch, January 8, 1978, pp. F-1, F-2.

55. League of Women Voters of Virginia. Your Virginia State Government. Richmond, Virginia: League of Women Voters, 1983.

56. Markert, Ken. "Albemarle County/Charlottesville Watershed Management Program." Unpublished paper written at Virginia Polytechnic Institute & State University, Blacksburg, Virginia, December 5, 1983.

57. Mason v. Lamb, 189 Va. 348, 53 S.E. 2d 7 (1949).

58. McCauley v. Phillips, 216 Va. 450, 219 S.E. 2d 854 (1976).

59. McElfish, Richard M. Director, Environmental Engineering Department, Chesterfield County, Virginia, telephone interview, August 13, 1985, personal interview, August 29, 1985.

60. McKinney v. Trustees of Emory & Henry College, 117 Va. 763, 86 S.E. 115 (1915).

61. Metcalf and Eddy, Inc. "1969 Occoquan Reservoir Study." Prepared for the Virginia State Water Control Board. Richmond, Virginia, 1970.

62. Michelman, Frank I. "Property, Utility, and Fairness: Comments on the Ethical Foundations of 'Just Compensation' Law." Harvard Law Review, Vol 80, No. 6 (April 1967), 1184-1262.

63. Michie's Jurisprudence of Virginia and West Virginia, 24 Vols. Charlottesville, Virginia: The Michie Company, 1979.

64. Morris, Thomas R. and Sabato, Larry. Virginia Government and Politics. Richmond, Virginia: Virginia State Chamber of Commerce and Charlottesville, Virginia: The Institute of Government, University of Virginia, 1984.

65. Muncaster, Thomas. Civil Engineer, Engineering Department, Albemarle County, Virginia, telephone interview, September 19, 1985.

66. Musselwhite, M. Leon. Engineer, Office of Water Resources Planning, Virginia State Water Control Board, Richmond, Virginia, interview, August 30, 1985.

67. Naisbitt, John. Megatrends. New York, N.Y.: Warner Books, 1984.

68. National Commission on Water Quality, 1976 Staff Report Washington, D.C.: National Research Council, January, 1976.

69. The Nonpoint Source Task Force, U.S. Environmental Protection Agency. "Final U.S. Environmental Protection Agency Nonpoint Source Strategy." Nonpoint Sources Branch, U.S. Environmental Protection Agency: Washington, D.C., October 25, 1984.

70. Norris, William K. Watershed Management Official, Albemarle--Charlottesville Office of Watershed Management, Charlottesville, Virginia, telephone interview, August 19, 1985.

71. Norris, William K. "South Rivanna Reservoir: A Brief History and an Unsolved Problem." Presentation to Charlottesville City Council, Charlottesville, Virginia, September 15, 1980.

72. Northern Virginia Planning District Commission. Guidebook for Screening Urban Nonpoint Pollution Management Strategies. Annandale, Virginia: Northern Virginia Planning District Commission, 1979.

73. Northern Virginia Planning District Commission and Virginia Polytechnic Institute and State University. "Occoquan/Four Mile Run Nonpoint Source Correlation Study." Final report prepared for the Metropolitan Washington Water Resources Planning Board. Washington, D.C., July, 1978.

74. Northern Virginia Planning District Commission. "Program Statement of Occoquan River Basin Nonpoint Pollution Management Program." Annandale, Virginia, February 5, 1982.

75. N.R.D.C. v. Train, 396 F. Supp. 1386 (DC DC 1975).

76. Pettyjohn and Sons v. Basham, 126 Va. 72, 100 S.E. 813 (1919).

77. Prosser, William L. Handbook of the Law of Torts, 4th ed. St. Paul, Minnesota: West Publishing Company, 1971.

78. Rak, Jonathan Procter. "Legislative Control of Nonpoint Source Water Pollution in Virginia." Unpublished paper written at Washington & Lee University Law School, Francis Lewis Law Center, Lexington, Virginia, April, 1985.

79. Raleigh Const. Corp. v. Faucett, 140 Va. 126, 124 S.E. 433 (1924).

80. Richmond v. Hood Rubber Products Co., 168 Va. 11, 190 S.E. 95 (1937).

81. Richmond v. Warehouse Corp., 148 Va. 60, 138 S.E. 503 (1927).

82. Roanoke Times. "Erosion Control in the County." April 25, 1975, p. 6.

83. Sayers v. Bullar, 180 Va. 222, 22 S.E. 2d 9 (1942).

84. Seeley, Gerard, Director, Technical Services Section, Division of Soil and Water Conservation, Richmond, Virginia, telephone interview, August 12, 1985.

85. Seventeen, Inc. v. Pilot Life Insurance Company, 215 Va. 74, 205 S.E. 2d 648 (1974).

86. Shoffner v. Sutherland, 111 Va. 298, 68 S.E. 996 (1910).

87. Smith, Herbert H. The Citizen's Guide to Zoning. Chicago, Illinois: American Planning Association, 1983.

88. Smith, William W. Engineer, Fairfax County Department of Environmental Management, Fairfax County, Virginia, interview on April 12, 1985.

89. Stillman, Edmund. The American Heritage History of the 20's and 30's. New York: American Heritage Publishing Company, Inc., 1970.

90. Tabler v. Fairfax County, 221 Va. 200, 269 S.E. 2d 358, (1980).

91. Taylor v. Virginia Construction Corp., 209 Va. 76, 161 S.E. 2d 732 (1968).

92. Thomas, Lee M. Administrator, U.S. Environmental Protection Agency. As quoted in Perspectives on Nonpoint Source Pollution. Proceedings of a National Conference in Kansas City, Missouri, May 19-22, 1985, p. 1.

93. Trevitt v. Prison Assoc. of Virginia, 98 Va. 332, 36 S.E. 373 (1900).

94. 7 United States Code Annotated § 136 et seq (Supp. 1985).

95. 28 United States Code Annotated § 1346, 1402, 1504, 2110, 2401, 2402, 2411, 2412, 2671 et seq (Supp. 1985).

96. 30 United States Code Annotated § 1201 et seq (Supp. 1985).

97. 33 United States Code Annotated § 1251 et seq (Supp. 1985).

98. 42 United States Code Annotated § 300 et seq, 1962 et seq (Supp. 1985).

99. University of North Carolina at Chapel Hill Center for Urban Studies. "Intergovernmental Cooperation for Watershed Protection: Charlottesville/Albemarle County, Va." Protecting Drinking Water Supplies Through Watershed Management. Chapel Hill, North Carolina, August, 1981, pp. 297-336.

100. 10 Vermont Statutes Annotated § § 6001 et seq (Supp. 1985).

101. Village of Euclid v. Ambler Reality Co., 272 U.S. 118 (1926).

102. Virginia Code Annotated § 3.1-189 et seq, 8.01-195 et seq, 15.1-1 et seq, 15.1-427 et seq, 15.1-945.1 et seq, 21-6 et seq, 21.89.1 et seq, 58.1-3000 et seq, 62.1-10 et seq (Supp. 1985).

103. Virginia Soil and Water Conservation Commission. Urban Best Management Practices Handbook (State Water Control Board Planning Publication 321). Richmond, Virginia: Virginia State Water Control Board, 1979.

104. Virginia Soil and Water Conservation Commission. The Virginia Erosion and Sediment Control Handbook. Richmond, Virginia: Virginia Soil and Water Conservation Commission, 1980.

105. Virginia State Water Control Board. Best Management Practices Handbook---Management. (State Water Control Board Planning Publication 322). Richmond, Virginia: Virginia State Water Control Board, 1981.

106. Virginia State Water Control Board. "You and Your Land." (State Water Control Board Information bulletin 551). Richmond, Virginia: Virginia State Water Control Board, 1982.

107. Virginia State Water Control Board. Water Quality Inventory, 305 (b) Report: Virginia. (State Water Control Board Information Bulletin 558). Richmond, Virginia: Virginia State Water Control Board, July, 1984.

108. Virginia State Water Control Board. Water Quality Management Planning in Virginia Under Section 208, Public Law 92-500---1973-1983. (State Water Control Board Information Bulletin 555). Richmond, Virginia: Virginia State Water Control Board, August, 1984.

109. Virginia State Water Control Board. 1984 Annual Report: Best Management Practices Program for Abatement of Nonpoint Source Pollution in Virginia. (State Water Control Board Information Bulletin 562). Richmond, Virginia: Virginia State Water Control Board, June, 1985.

110. Washabaugh v. Northern Virginia Const. Co., 187 Va. 767, 48 S.E. 2d 276 (1948).

111. Washington Post. February 16, 1976.

112. Washington Post. January 10, 1985, p. A1.

113. Washington Post. September 18, 1985, p. C7.

114. Water Planning Division, United States Environmental Protection Agency. "Results of the Nationwide Urban Runoff Program: Executive Summary." Washington, D.C.: United States Environmental Protection Agency, December, 1983.

115. Water Pollution Control Federation. "Highlights." November 1985, Volume 22, Number 11.

116. Weand, B. L. et al. "External Factors Affecting Water Quality in an Eutrophic Impoundment." Water Supply, 1 (1983), pp. 94-96.

117. Whipple, William et al. Stormwater Management in Urbanizing Areas. Englewood Cliffs, New Jersey: Prentice-Hall, Inc., 1983.

118. Wilkinson, M. H., Executive Director of the Virginia Commission on Local Government, Richmond, Virginia, letter dated July 25, 1985.

119. Yaeck, David C. "Detention Ponds: A Local Government Viewpoint." Proceedings of the conference on Stormwater Detention Facilities: Planning, Design, Operation and Maintenance held at New England College, Henniker, New Hampshire, August 2-6, 1982.

120. Yearwood, Richard M. Planning and Land Use Controls: Zoning and Subdivision Regulations in Virginia. Blacksburg, Virginia: Center for Urban and Regional Studies, Virginia Polytechnic Institute and State University, 1971.

VITA

Gordon Marshall Wells

The author was born at Fort Belvoir, Virginia on December 11, 1956. He graduated from the United States Military Academy in June of 1979 with a B.S. in General Engineering and was commissioned a Second Lieutenant in the U.S. Army Corps of Engineers. After attending Airborne School, Ranger School and the Army Engineer Officer Basic Course he served in a Combat Engineer Battalion in West Germany for four years which provided combat engineer and construction support to NATO. In 1984, he attended the Army Engineer Advanced Course, qualified as a Professional Engineer in the Commonwealth of Virginia, and began studies toward a M.S. in Civil Engineering at Virginia Polytechnic Institute & State University in Blacksburg. His concentration was water resources engineering.

END

FILMED

3-86

DTIC